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2011

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Influence of Licensed Staffing Hours, Contract Nursing, and Turnover on MDS-Based Quality Measures in Texas Nursing Homes

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Influence of Licensed Staffing Hours, Contract Nursing, and Turnover on MDS-Based Quality Measures in Texas Nursing Homes

by

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Dissertation

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Doctor of Philosophy

The University of Texas at Austin

August 2011

Dedication

I would like to dedicate this dissertation to those who left too soon, especially to three important women who were the epitome of strength as role models to many. First, my dear mother-in-law, Isabell Roques Ragsdale, who had a heart full of love for all of her family; Elizabeth "Anne" Ward Ragsdale, my sister-in-law, who was a pillar of strength to her family and friends; and last, my sweet "Mama," Norma "Marie" Raley Cooper. Without her loving encouragement and gentle push, I would have never accomplished this dream. Mama is the reason I was able to continue with the drive and motivation to work and study starting at the age of nineteen and picking back up many years later. Thank you, Mama. I also dedicate this to my father-in-law, Billie Oscar Ragsdale, who traveled to be with our family for my bachelor's and master's degree ceremonies into his eighties—we will miss you for this one, Dad. I would also like to thank my "daddy," Dunbar Elonzo "Lonnie" Cooper, who was a role model with his very strong work ethic. And I dedicate this to my beloved Lisie, our twenty-one-year-old cat that died in 2009 and greeted me throughout my MSN and part of my PhD program many late nights to welcome me home. I still miss your "welcome home," my sweet old kitty. One last dedication is to my sweet "Aunt Lois" the last of seven sisters. Your strength, wisdom, and love for many continue year after year.

Acknowledgements

I would like to acknowledge my dissertation committee: you have been there to guide me through the twists and turns of this research. Thank you to my chair, Dr. Graham McDougall, and to Dr. Gayle Acton, Dr. Deborah Volker, Dr. Robert Godbout, and Dr. Catherine Hawes. I would like to especially thank Dr. Robert Godbout, Erika Hale, and Kara Lee Poschman for their statistical genius. This dissertation held many unknowns for the data analysis, and this team demonstrated their dedication through each obstacle we approached. I would like to thank my friends and colleagues who have believed in me over my Texas long-term care journey; my special friends, Mr. Herman Sabrsula and his wife, Betty—you are both dear to my heart; my best friend, Colleen Greenlees—Girlfriend, there are more glasses of wine that await us; Mr. George Linial, a dear friend and colleague, leading the charge for long-term care advocacy as President of TAHSA; Mr. Scottie Casey, thank you for being such a strong support; Dr. Carol Delville who has encouraged me over the course of this program; and a very special thank you to my dear friend, colleague, and mentor, Dr. Pearl Merritt. Without your support and belief in me, I could not have completed this journey. This, Dr. Merritt, is "a good thing."

This last paragraph is for the family who kept the home fires burning: my daughter, Jennifer; my son-in-law, Dan; my grandson, Maddox; and my granddaughter, Isabell—"Mama Razdell" loves you all. I would like to thank my two sons, Donnie and Cody, who continue to encourage me and believe in me even on my worst day. Last, my number one acknowledgement goes to my husband, Don, who has shown unselfish love and encouragement throughout my years of continued education. He has always told me that I could accomplish this dream and believed in my professional endeavors over the years. Thank you, Don. I could not have accomplished this dream without you at my side.

Influence of Licensed Staffing Hours, Contract Nursing, and Turnover on MDS-Based Quality Measures in Texas Nursing Homes

Publication No._____

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The University of Texas at Austin, 2011

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PURPOSE: Substantial research demonstrates that many nursing homes are not providing adequate quality of care for residents because of inadequate processes of care and insufficient numbers and training of nursing staff. Some residents experience poor-quality outcomes, such as pressure ulcers and unintended weight loss. To address these issues, the long-term care industry has focused on improving quality of care by improving staff education about care processes and reducing nurse turnover rate. The aim of this study was to compare the association between - licensed nurse hours of care and turnover rate to five quality measures—incidence of ADL decline, physical restraints, prevalence of pressure ulcers among residents with risk factors for skin breakdown, and prevalence of unintended weight loss. DESIGN: The study population included 618

freestanding Texas nursing facilities. A cross-sectional multiple regression analysis was conducted using 2007 data to examine the relationship between nurse staffing levels and turnover and resident outcomes with control variables for facility and resident characteristics. RESULTS: The high-risk pressure ulcer variable accounted for 10% of the variation in the regression model. LVN (hprd) was positively associated with an increase in high-risk pressure ulcers. The ADL decline variable accounted for 7.5% of the variation in the regression model, and RN hprd was positively associated with ADL decline. The prevalence of weight loss variable accounted for 3% of the variation in the regression model. RN turnover rate was approaching significance. The physical restraint variable accounted for 2% of the variation in the regression model. LVN contract hprd was significant and positively associated with an increase in physical restraint use although a minimal contribution to the model given the low percentage of LVN contract hprd. The prevalence of low-risk pressure ulcers was not significant. The control variable case mix index was positively associated with ADL decline, high-risk pressure ulcers, and weight loss. CONCLUSIONS: This research will contribute to understanding the relationship of licensed nursing staff to resident outcomes. Additionally, it will contribute to nursing education, research, and policy. While controlling for acuity using case mix index, some negative findings were still noted that requires further research.

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Chapter 1: Overview of the Study

PURPOSE AND RESEARCH QUESTIONS

The purpose of this study was to compare the association between - licensed nurse hours of care and nurse turnover rate to five quality measures—incidence of ADL decline, physical restraints, prevalence of pressure ulcers among residents with high and low risk factors for skin breakdown, and prevalence of unintended weight loss.

- What is the relationship between RN hours per resident day, RN turnover rate, percentage of RN time that is contract, LVN hours per resident day, LVN turnover rate, and percentage of LVN time that is contract and the prevalence of high-risk pressure ulcers stages 1–4, adjusting for facility size, case mix, geographic location (rural vs. urban), ownership, and resident age?
- What is the relationship between RN hours per resident day, RN turnover rate, percentage of RN time that is contract, LVN hours per resident day, LVN turnover rate, and percentage of LVN time that is contract and incidence of ADL decline, adjusting for facility size, case mix, geographic location (rural vs. urban), ownership, and resident age?
- What is the relationship between RN hours per resident day, RN turnover rate, percentage of RN time that is contract, LVN hours per resident day, LVN turnover rate, and percentage of LVN time that is contract and the prevalence of weight loss, adjusting for facility size, case mix, geographic location (rural vs. urban), ownership, and resident age?
- What is the relationship between RN hours per resident day, RN turnover rate, percentage of RN time that is contract, LVN hours per resident day, LVN

turnover rate, and percentage of LVN time that is contract and the use of physical restraints, adjusting for facility size, case mix, geographic location (rural vs. urban), ownership, and resident age?

- What is the relationship between RN hours per resident day, RN turnover rate, percentage of RN time that is contract, LVN hours per resident day, LVN turnover rate, and percentage of LVN time that is contract and the prevalence of low-risk pressure ulcers stages 1–4, adjusting for facility size, case mix, geographic location (rural vs. urban), ownership, and resident age?

BACKGROUND

The long-term care industry is working to meet the growing demands of senior care at various levels throughout the United States. More than 6 million seniors over age 65 need some type of long-term care in the United States today, and 1,393,127 resided in nursing homes in 2009 (State Health Facts, 2011). Spending on long-term care needs is expected to almost double by 2020, from approximately $123 billion in 2000 to a projected $207 billion (Feder, Komisar, & Niefeld, 2000). Medicaid spending for seniors, although small in percentage compared with the entire U.S. budget, was one of the two recipient groups with the highest expenditures for fiscal year 2007 at $70.9 billion. The rate of Medicaid expenditures over the next 10 years for all age groups is expected to grow beyond the economy's ability to keep up with the demands of this program (CMS, 2008c; Kaiser Commission, 2006). The growing need for senior care and the costs of providing it will place additional demands on the effort to provide quality care.

As far back as the early 1800s, deciding where seniors would live out their remaining years has been a concern. In the nineteenth century, some children or other relatives kept their seniors at home to live with them, while others moved westward,

leaving for a better life where land was affordable and jobs could be found to sustain their families. During this westward movement, seniors did not always go along and were often left behind, requiring the care and services of other individuals for activities of daily living and help during times of illness and stress. Older adults who needed a place to live or someone to care for them sometimes went to live in a poorhouse that housed a variety of individuals. Some poorhouses were like a boarding house where individuals took in a few seniors (ElderWeb, 2006; Yeatts, Cready, & Noelker, 2008).

Other poorhouses consisted of various types of indigent individuals living together out of absolute necessity. Many poorhouses throughout the United States housed people who were mentally challenged, criminals, and seniors all together under one roof. Conditions could be crowded with the sick and well living together. Those who were able to work and contribute to daily life in the poorhouse were expected to provide assistance in return for a place to live. These living arrangements were often unsanitary because of the overcrowding and the indigent population. Taxpayer money supported poorhouses, but they were not well run in most cases. This created a substandard situation for vulnerable seniors and quickly became a national concern. Up to this point, little regulation had been imposed on senior housing, and most poorhouses would not have been deemed as acceptable living accommodations by any standards. Over time, the government took on a greater role in the oversight of senior care, addressing quality, safety, and dignity issues. Benevolent societies began to address the growing need for dignified senior care. Other types of senior care developed over the years, including in-home care, homes for the aged, group-type residential housing for seniors, welfare relief, state relief, and then federal relief, which came about in the 1960s with the introduction of Medicare and Medicaid. These services offered seniors a better life than they had in comparison with the earlier, unregulated poorhouses, along with health care to sustain or

improve their physical being (ElderWeb, 2006; Kane & Wilson, 1993; Yeatts et al., 2008).

Although continued improvement in long-term care has occurred over the years, homes continue to be viewed by the public and others as substandard providers of care (Wiener, 2003). The Omnibus Budget Reconciliation Act of 1987 (OBRA 87), known as the Federal Nursing Home Reform Act, was passed to improve the quality of life of nursing home residents. Additionally, OBRA 87 addressed issues of resident rights, the use of chemical and physical restraints, autonomy in decision making, and the maintenance or restoration of functional loss (Turnham, 2001).

While there has been some improvement in the quality of senior care since the passing of OBRA 87 (Hawes et al., 1997; Turnham, 2001) in areas such as the reduction of chemical and physical restraints, expanded efforts are needed to address considerable improvement that is sustained over time and that occurs in other key areas of quality as well. Examples include ADL decline, pain, pressure ulcers, urinary incontinence, weight loss, and malnutrition (Institute of Medicine [IOM], 2001) where there is minimal change or no significant improvement noted over time (Coleman, Martau, Lin, & Kramer, 2002; Hawes, 2003; Hughes & Lapane, 2005; Snowden & Roy-Byrne, 1998).

Many nursing home providers, and others who share a growing concern about the quality of nursing home care, continue to work tirelessly to affect long-term care legislation that meets the challenges for senior care (Turnham, 2001). With the continued need for quality improvement, OBRA 87 has compelled long-term care providers to evaluate whether or not the care they provide meets regulatory guidelines enforced by state and federal requirements. In some instances, quality improvement outcomes have been unfavorable, and consequently, providers continue to search for ways to sustain and improve positive outcomes across the long-term care industry.

Still, some nursing homes continue to deliver substandard care. Of the approximately 16,000 nursing homes in the United States (Kaiser, 2011), 25% or greater have significant citations or deficiencies, including substandard care that has led to harm to or in some cases the death of residents (Feder et al., 2000; U.S. General Accounting Office [GAO], 1987, 1999, 2005; Maas, Specht, Buckwalter, Gittler, & Bechen, 2008; U.S. Department of Health & Human Services, 2007). As these problems continue to develop throughout the industry, the complexity of resident needs continues to increase, especially with lengthening life spans and increasing numbers of chronicities per resident. Consequently, higher resident acuity levels have posed increasing challenges for providing nursing home care (Gray-Siracusa, 2005; IOM, 2001; Marek & Rantz, 2000; Spellbring, 2001). In many cases, a senior is admitted to a nursing home after experiencing an illness that requires hospitalization, after which they need continued care or even skilled services, such as physical therapy or specialized nursing care, necessary to return to a home setting. These are nursing services that require various staff members to meet the increased needs (Bostick, Rantz, Flesner, & Riggs, 2006). Additionally, some residents who live in a nursing home need end-of-life, hospice, or palliative care. Such services increase the need for staff members trained to meet the end-of-life care needs of these residents. However, with the high costs of providing care and budgetary constraints, nursing home administrators do not always consider the effects of increasing acuity levels or case mix along with staffing needs. The Long Term Care Institute selected a sample of 48 nursing homes, making site visits to review staffing practices, between 2002 and 2003 and found that more than 90% of the homes did not use a procedure for adjusting staffing for higher resident acuity levels (Reilly, Mueller, & Zimmerman, 2006).

In addition, maintaining enough quality staff in long-term care is an ongoing issue that is not easily resolved. The staffing numbers for nurses and nurse aides are inadequate

(Harrington, Carrillo, Thollaug, & Summers, 1999; Hawes, 2003). Inadequate staffing levels lead to a failure to meet the basic needs of nursing home residents and contribute to poor resident outcomes such as malnutrition and dehydration (Shipman & Hooten, 2007). Often, there are inadequate numbers of RNs, licensed nurses (LPN/LVNs), and nurse aides to meet resident needs (Harrington, 2005; Kayser-Jones, 2002; Kayser-Jones, Schell, Porter, Barbaccia, & Shaw, 1999; Shipman & Hooten, 2007). Staff struggle to provide basic resident care, and there is little time left to provide additional services to improve quality of life. Examples of additional needed services are activities or special programs that address individualized resident needs and interests (Kane, 2003).

Staffing turnover is another serious concern in long-term care affecting nurses, nurse aides, and other direct care staff. Furthermore, the aging workforce also contributes to the staffing shortage (IOM, 2001), complicating an already burdened system. Additionally, there is a growing concern that it will become increasingly difficult to recruit new nurses to long-term care and retain the more experienced ones who have remained in the profession. As nurses' age and retire, there are fewer nurses to recruit into long-term care. Many nurses do not find long-term care a desirable or challenging area of nursing. The work environment is also a concern, with heavy workloads and the increasing need for nursing staff to work overtime. Compounding these issues is the shortage of support staff to assist the nurses and wage and benefit plans that too often do not meet the needs of the staff and their families (CMS, 2001; GAO, 2001). A related issue is that the staffing shortage may contribute to the use of contract nursing staff, which is problematic because it affects the continuity and quality of resident care (Castle & Myers, 2006; Bourbonniere et al., 2006).

The staffing shortage is a complex issue that continues to be challenging and without a simple solution. The literature has established a need for increased numbers of

qualified staff to improve the quality of care (Bostick, 2004; CMS, 2001; Harrington, Zimmerman, Karon, Robinson, & Beutel, 2000; Shipman & Hooten, 2007). The IOM (2001, p. 4) defined *quality* with a simple equation that focuses on quality rather than costs, expressed in basic terms of value = quality/cost. This expression of quality applies to any change in market value across the spectrum at any given time. Because it reflects quality as the priority over costs, it sends a clear message about the proper priority and place of importance that quality deserves in long-term care, rather than sending a message regarding cost savings or cost reduction when human resources, supplies, and other care are needed. What is not accounted for in this equation and must be acknowledged is the inequality in the payment system for long-term care services throughout the United States, an issue that has a major bearing on providers who desire to provide quality care, are populated with high numbers of Medicaid recipients whose provider reimbursement rates vary considerably across states, and are forced to deal with a Medicaid shortfall year after year.

Medicaid reimbursement rates, in most states, are usually not enough to cover the per-day cost of care. Because of this shortfall, nursing home providers who participate in the Medicaid program must absorb the difference in the cost of care. Furthermore, many of these nursing homes have a not-for-profit ownership status, which increases the financial burden. This is a serious issue and one that contributes to poor resident outcomes. In a report prepared by Eljay, LLC, in 2008 for the American Health Care Association about the Medicaid shortfall in nursing home funding, the actual costs per day for 41 states were compared with the Medicaid reimbursement rate for 2006. Most states had a shortfall, ranging from $0.71 below the cost of providing resident care per day for Montana to $29.12 below in Vermont. Only one state had a cost per day that was lower than the reimbursement rate: Arkansas, at $1.24.

Government funding of long-term care services should cover resident care needs and allow providers to maintain staffing levels that safely meet these needs. Staffing levels and quality of care have been associated with low Medicaid funding in previous studies—more specifically, low reimbursement rates and lower staffing levels (Cohen & Dubay, 1990; Zinn, 1993b; Aaronson, Zinn, & Rosko, 1994; Cohen & Spector, 1996; Grabowski, 2001; Harrington, Swan, & Carillo, 2007).

In a 1996 study requested by Congress and conducted by the Institute of Medicine, staffing levels in hospitals and nursing homes were evaluated. A positive relationship was found between nurse staffing levels and quality of care. It was further determined that a need exists for increased staffing levels, particularly increased RN hours. Other research also indicates that licensed nurses, particularly registered nurses (RN), positively impact resident outcomes, manifested in decreased incidence of pressure ulcer development, urinary tract infections, functional decline in ADLs, and hospitalizations (Castle & Myers, 2006; Decker, 2006; Hendrix & Foreman, 2001; Horn et al., 2005; Weech-Maldonado, Meret-Hanke, Neff, & Mor, 2004). Because of the IOM's findings, the Nursing Home Reform Act (NHRA) requires Medicare- and Medicaid-certified nursing homes to have an RN in the role of director of nursing (IOM, 2001; Omnibus Budget Reconciliation Act of 1987; Zhang, Unruh, Liu, & Wan, 2006); 8 hours of RN staff per day, 7 days per week; and a licensed nurse (RN or LPN) on duty for each shift. Additionally, it requires nurse aides to obtain a minimum of 75 training hours in education regarding basic care needs of the aging in a long-term care setting. Currently regulatory guidelines are not specific as to a minimum number of nurses or nurse aides beyond the NHRA passed by Congress, and there is no requirement for the presence of an RN 24 hours per day. None of the staffing standards described considers the ratio of

nursing home population to staff. The same staffing standards apply for nursing homes of any size, large or small, throughout the United States (Zhang et al., 2006).

Furthermore, the issue of staffing standards in regard to adequate oversight by an RN is a concern. This has been identified in research as a contributing factor to positive outcomes. Gray-Siracusa (2005) noted that RN staffing was associated with a decrease in the incidence of weight loss, number of bedfast residents, and pressure ulcers, whereas LPN staffing was associated with an increase in urinary tract infections. RN leadership and oversight is critical to positive resident outcomes. Having enough staff trained to provide the time and attention to those who reside in a nursing home is a crucial part in the effort to meet residents' needs (Castle & Myers, 2006; Decker, 2006; Dellefield, 2006a, 2006b; Dorr, Horn, & Smout, 2005; Harrington & Swan, 2003; Harrington, Zimmerman, et al., 2000; Hendrix & Foreman, 2001; Horn et al., 2005; Shipman & Hooten, 2007; Weech-Maldonado et al., 2004; Zimmerman, Gruber-Baldini, Hebel, Sloane, & Magaziner, 2002).

Overall, numerous issues related to the long-term care workforce warrant attention, including legislative action that effectively addresses the issues of adequate staffing in U.S. nursing homes, which do not have enough staff to provide quality care. Consequently, residents suffer and experience poor-quality outcomes.

THE HISTORY OF QUALITY IN LONG-TERM CARE: PRE–OBRA

Since as early as the late 1950s, the quality of nursing home care has been examined. Survey certification pre–OBRA was administrative in nature, not addressing some of the more serious issues that would eventually come about related to quality of nursing home care (Morris et al., 1990). That changed in the 1970s, when a U.S. Senate subcommittee responded to concerns related to quality care throughout the nursing home

industry. Congress mandated that states fund some of the care of the aging during these years through such avenues as amendments to the Social Security Act (Morris et al., 1990; Yeatts et al., 2008). Additionally, other funding sources for aging services were created through the Hill-Burton Act (1956) and the creation of the Federal Housing Administration (Yeatts et al., 2008), which provided federal funding for nonprofit nursing homes even before Medicaid aging services were funded through the Kerr-Mills Act of 1960, a program that offered some support for nursing homes for the aging and their families who could not afford to pay for these services (Yeatts et al., 2008).

A major step in the improvement of aging services came in 1965 with the implementation of the Medicare and Medicaid programs. Signed under the presidency of Lyndon B. Johnson, Medicare (Title XVIII of the Social Security Act) and Medicaid (Title XIX) were created partly to help the many aging people age 65 and older, providing much needed health care coverage. Under the Medicaid program, various levels of care were provided for low-income children and elderly persons. When the Medicare program started in 1966, more than 19 million seniors enrolled so that they would have coverage during their later years. The two agencies were joined together in 1977 (CMS, 2008[c]). Although these steps represented progress over time, serious questions have continued to surface since the programs' creation about the quality of care provided to the nation's aging population, reaching a fever pitch in the late 1970s and early 1980s.

The Reagan administration proposed rules intended to lighten the regulatory demands on nursing home providers. This was unsettling to aging Americans, their families, and advocates of nursing home residents, as they saw this as a measure that would potentially undercut the hard-won gains in quality care (Morris et al., 1990). Fortunately, Congress blocked the proposal and asked the Health Care Financing

Administration (HCFA) to evaluate the status of quality in nursing homes throughout the nation. Furthermore, beyond evaluation, HCFA was charged with formulating a plan to address the quality of nursing home care (Morris et al., 1990) and with developing a standardized assessment instrument to be used throughout the long-term care industry. This process was the beginning of the Resident Assessment Instrument, which established new standards and expectations for nursing homes, and provided a guide for the development of resident care plans. This new instrument served as a tool for multidisciplinary teams to use in quality improvement.

THE UNIQUENESS OF LONG-TERM CARE

Long-term care is unique in many ways. It is heavily regulated and is faced with many challenges related to financing structures. Multiple workforce issues have been dealt with over the years and continue to be problematic. A lingering stigma in long-term care portrays it as a forgotten culture of health care lost in the shuffle of legislative uncertainty and often thought of less highly than other areas of health care. The following are issues and concerns that are important to how long-term care is viewed by the general public and to where long-term care stands in relationship to positive movement forward, funding, and the future of this system in general.

The Forgotten Ones

Long-term care encompasses a large number of elders forgotten by society, scarcely remembered by those once served by these living beings. The nursing home has not been idealized as a glamorous place for seniors to live, age, and die. Rather, it has often been depicted as a dreary, gloomy, sterile environment that offers little to stimulate those who reside in it (Ragsdale & McDougall, 2008). The mental image of long-term care is often void of dignity or respect. In fact, the term *medical model* is sometimes used

to describe the clinical care provided to nursing home residents throughout the United States (Haran, 2006; Stone, 2000), although this term does not always address issues related to psychosocial health or quality of life concerns that are also an important part of aging health (Kane, 2003). Additionally, the greater resident capacity of some nursing homes conjures a negative image that has been cited as a concern in research (Harrington, 2005; Rantz et al., 2004). Increasingly, research is indicating that smaller nursing homes that house fewer residents have shown favorable results through the improvement of quality of life outcomes and satisfaction for residents, staff, and families (Kane, Lum, Cutler, Degenholtz, & Yu, 2007). The nursing home image held by the public in general is often one of an environment that pays little attention to the needs of the older population or the staff who care for them (Barba, 2002). This issue has produced concern regarding how the minimum standard of care for the elderly population is being met. According to Olson (2006, p. 294),

> The nursing home produces a leveling, a loss of dignity that cuts across class lines. Alike, the residents are forced to eat and sleep at given times, bathe at the convenience of the institution, live with difficult roommates, and risk the few precious items they still own.

Nursing home providers' desire for change is not enough. New models of care are being researched and have been slowly evolving over the past decade, and cultural change in long-term care is gradually becoming better understood but is still considered to be in its infancy. The monetary problems related to funding programs and increasing staff salaries are just a small part of the issues that place constraints on institutions' ability to change and improve. However, the change movement in long-term care appears to hold promise. Programs to improve quality of life for the residents and staff do exist. Cultural change also addresses environmental issues and ways to make life more pleasant and homelike. Quality of life is as important as quality of care. Research is beginning to

show that quality of life is equally as important as physical well-being. Gradually, providers and key stakeholders are addressing quality of life as a significant concern in long-term care (Hawes, 2003; Ragsdale & McDougall, 2008; Roth, 2005; Kane, 2003).

Regulatory Guidelines and Enforcement

Regulated by CMS, all licensed nursing homes must meet strict federal and state regulatory guidelines, which have been enforced more strongly over the past 20 years since OBRA 87 became effective. This mandate has been the driving force behind requiring nursing home staff to live up to the expectations of Congress. Through the changes that have evolved since OBRA 87, some improvement has been made; however, improvement has not been to the extent expected (GAO, 1987, 1999, 2002, & 2005). Therefore, rigorous standards are often unmet.

In 2001, a survey of nursing homes throughout the United States resulted in 89% of them receiving a written citation for at least one deficient practice (Office of Inspector General, 2003). Regulated under the same guidelines as homes that provide high quality care, these nursing homes failed in some way to meet the expected state guidelines. These homes had various penalties imposed, including monetary fines and, in some cases, being in jeopardy of losing their license.

However, surveys and enforcement have not been performed to the level intended by the federal government. According to Harrington (2001), a GAO review found that the state survey teams do not always identify serious issues when they conduct annual nursing home surveys. Because of this concern, stronger oversight has been implemented in various forms. One example is the CMS program started in 2007. CMS is compiling a list of nursing homes across the United States that provide some type of substandard care, using data such as a higher percentage of pressure ulcers or of physical restraint use. State

agencies, in conjunction with the federal oversight, will survey the identified nursing homes to determine whether they are improving and progressing toward higher quality care or if the substandard practices have continued. If improvements are not made within a specified period, Medicare and Medicaid services and funding will be terminated (CMS, 2007).

According to Hawes (2003), in testimony before the U.S. Senate Committee on Finance, the most significant factor contributing to poor quality of care is insufficient staff. Hawes further argued that the staffing shortage in long-term care must be addressed before quality concerns can be approached (Hawes, Mor, Phillips, Fries, Morris, Steele-Friedlob et al., 1997; Hawes, 2003; Kash, Castle, & Phillips, 2007; Kash, Hawes, & Phillips, 2007).

The research team conducted interviews with staff and families and also held focus groups with the direct care staff, and the researchers heard the same message echoed among those interviewed: staffing is a major issue that affects quality of care. The nurse aides described their inability to provide the basics of resident care in regard to activities of daily living—from changing a brief as often as needed to feeding, assisting with fluid intake, and performing other necessary duties. Each of these reflects potentially serious negative outcomes if they cannot be accomplished regularly, and each reflects the need for sufficient staff to provide the basics of care. Such examples provide substantial evidence about staffing issues and speak volumes as to what those closest to the residents think about these serious issues.

Financing

The financing of long-term care services throughout the United States is a constant concern. With 44% of long-term care expenditures funded by the Medicaid

program (Eljay, L.L.C., 2008) and the majority of all other nursing home care by Medicare and private-pay funding, the struggles to address these issues at the state and federal levels are ongoing. Less money is being spent on nursing home care, and more is being redirected into community-based and home-care type services; this has been the trend over the past decade, and it is projected to continue in this direction (Eljay, L.L.C., 2008). The costs of aging services are expected to increase with the baby boomers retiring, with projections placing aging service costs at more than $200 billion by 2020. The financial burden and hardship this places on the Medicaid system to maintain long-term care costs is clearly seen in the reimbursement rate for aging services in Texas.

According to the Texas Health Care Association, (2008) there is a crisis of underfunding in Texas, which ranks 49th out of the 50 states on the average Medicaid per-diem reimbursement rates for nursing facilities. The low Medicaid reimbursement rate for seniors who qualify for care in a Texas nursing home has been identified as a critical issue associated with staff shortage. The issue of adequate staffing related to Medicaid funding for senior care has been problematic in the past, and the projections call for it to continue to worsen (CMS, 2008c). Medicaid reimbursement is linked to the shortage of RNs, another significant problem (Harrington & Swan, 2003), notwithstanding the shortage of other direct care staff, most notably nursing assistants.

Medicaid state programs funded approximately $110 billion of nursing home through health care spending in 2003 and are projected to spend approximately $195 billion in 2014 (Heffler et al., 2005; Horn, Buerhaus, Bergstrom, & Smout, 2005; U.S. Census Bureau, 2002). These projections in light of current funding is inadequate to meet the escalating costs of health care in the aging population. Additionally, adequate education and training specific to aging residents' needs is an important issue that must

be addressed by the long-term care industry (Maas et al., 2008; Mezey & Harrington, 2006; U.S. Department of Health & Human Services, 2007).

In one research study the author quoted a participant who explained the situation well

> "The Medicaid system drives so much of our entire budget. It is mandating, on the one hand, quality care and, on the other hand, it is saying that you only have so many dollars to pull it off. And that's caused some conflicts because you can't produce the high level of quality that is mandated with the money that they give you to do it. And that's always very, very hard" (Sikma, 2006, p. 26).

THE INSTITUTE OF MEDICINE REPORT AND OBRA 87

In 1983 the HCFA contracted with the Institute of Medicine (IOM) to study nursing home concerns, after which the IOM recommended that the HCFA enforce quality change throughout the nation's nursing home system. In 1986, after a thorough evaluation of the quality of nursing home care, including safety for the patients who live in these environments and the safety of the staff work environment, the IOM and a team of experts made extensive recommendations to HCFA (IOM, 1986, 1996, 2001, 2004). This report was the beginning of mandated improvement in quality of care as well as continued recommendations over the next two decades, a process that started with OBRA 87.

The contracted team's findings and recommendations for OBRA 87 addressed many basic resident issues that affect quality of care and quality of life using a standardized resident assessment instrument. This instrument would become the foundation for clinicians and other interdisciplinary staff at nursing homes across the United States to use in the development of individual care plans for each resident. OBRA 87 was also intended to allow residents to maintain their rights after admission to a nursing home and be free from physical or chemical restraints. This issue had been a

constant problem with nursing home care over the years, and the passing of OBRA 87 was the first serious attempt at addressing it. Emphasis was placed on the residents' ability to continue personal decision making in areas such as banking and other financial services. Most important, it asserted residents' right to be included as a member of the care plan team and retain decision-making ability about the individualized plan of care. Other provisions were included that would positively affect residents' quality of life and care (Turnham, 2001).

To ensure that the recommendations' implementation was not left to chance, the National Citizens' Coalition for Nursing Home Reform (2001) organized a campaign to support the federal improvements. The group made sure that this extensive list of recommendations was not forgotten and was implemented in a timely manner (Turnham, 2001). Since OBRA 87's implementation, the IOM has continually provided reports and updates on the state of quality in the long-term care industry as well as on the need for staffing levels that allow caregivers to meet resident needs. This has been a daunting challenge for nursing homes, evidenced by its continued coverage in government reports and in the IOM's 2004 publication.

THEORETICAL FRAMEWORK

The framework for this study has been used by multiple researchers over the past two to three decades, particularly in outcomes research. Donabedian's quality framework (Donabedian, 1966) has been used in health care research over the last four decades; more specifically, it has been used to study the relationship of structure, process, and outcomes in organizational settings such as hospitals. This framework has also been used in dissertation research specific to long-term care over the past decade (Collier, 2008; Crickard, 2005; Parsons, 2004; Adams-Wendling, 2005).

Donabedian's quality framework was identified in 5 of 17 outcome studies in a long-term care setting; however, it was implicitly referenced in others. This framework has been associated with long-term care outcomes and quality of care research, which encompasses a multidimensional focus (Dellefield, 2000, 2006a; Dyck, 2007; Harrington, 2001, 2005; Harrington, Carrillo, & Mercado-Scott, 2005; IOM, 1996, 2001; Wan, Zhang, & Unruh, 2006; Weech-Maldonado et al., 2004). Various adaptations have been used over the years, building on the original model. Its three domains describe the structure, process, and outcomes of an organization (see Figure 1).

- *Structure* includes organizational characteristics such as the location of the facility, ownership type, facility size, and makeup of the physical plant. Staffing is part of the structural domain and covers all aspects of staffing, including staff mix, turnover rate, salaries, and benefits.
- *Process* leads to outcomes through the delivery of services as it is affected by structure. Customer service and staff attitudes toward the residents or nursing home clients are examples of the process of care. If the structural variables within a facility are viewed as positive—such as adequate pay, benefits, and resources—staff may reflect a positive attitude toward residents.
- *Outcomes* are a result of how structure and process react in response to the care provided. If the process of care is perceived as good, the outcome will most likely be reflected in resident satisfaction. Outcome is not viewed as just a numeric or scale value but also encompasses the individual's perception and attitude toward the care. Customer, family, and staff satisfaction are important outcomes in measuring quality of care (Dellefield, 2000; Donabedian, 1966).

Various interpretations of Donabedian's quality framework have appeared in quality research in past years, as have models that build on the original version (Bostick,

2002; Mitchell, Ferketich, & Jennings, 1998; Reilly et al., 2006). Reilly et al. (2006) used Donabedian's framework to support the argument for a nurse staffing taxonomy. The authors described the theoretical approach and included an operational definition under the classification domain. In providing an operational approach, Reilly et al. allows the reader to understand how this framework can be applied in a long-term care setting.

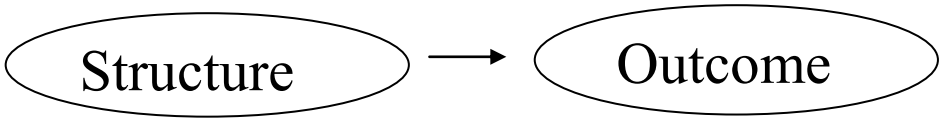
Examples for structure, process, and outcome domains are seen in various models for quality of care and are used in research related to nursing homes throughout the United States. Reilly et al., furthermore, provide an example of a structural domain using long-term care regulations, the nursing home environment, and staff incentive programs. Examples of process domains include education, decision making, and the staff work schedule, and finally, examples of the outcome domain include quality of life and quality of care outcomes for the residents and the staff and reflect today's post–OBRA model. An increased emphasis on quality improvement in long-term care has driven this issue, simultaneously raising providers' awareness. Reilly et al. place greater emphasis on the domains that capture today's quality needs for the residents and the staff, keeping with the changing trends in raising the expectations for long-term care.

APPLYING DONABEDIAN'S THEORETICAL FRAMEWORK TO THIS STUDY

Donabedian's framework guided this study to evaluate for a relationship between staffing levels for RNs, LVNs, contract RNs and LVNs, turnover rate, and five ~`quality measures—(1) percentage of residents whose need for help with daily activities has increased, (2) percentage of residents who were physically restrained, (3) percentage of high-risk residents who have pressure ulcers in stages 1–4, (4) percentage of low-risk residents who have pressure ulcers in stages 1–4, and (5) percentage of residents who lose too much weight while controlling for facility size, ownership, location, case mix,

and resident age. Structure variables include staffing levels for RNs, LVNs, and contract nursing staff and turnover rate. Additionally, control variables, facility size, resident acuity (case mix), geographic location (rural vs. urban), ownership (for-profit, nonprofit, and government status), and resident age were included in the structure framework. *Outcome* was defined as the five quality measures or dependent variables used in this study. Process, however, was not included in the framework that guides this study because the aim of the study was to examine the influence of structure variables on outcomes in a cross-sectional design. A one-time snapshot measurement cannot capture process variables because they require measurement over time. See Figure 1. Theoretical Framework based on Donabedian's quality framework.

Figure 1. Theoretical framework based on Donabedian's quality framework



Independent variables

- Staffing Levels
- Hours per Resident Day (hprd)
  - RNs
  - LVNs
  - Contract RNs
  - Contract LVNs
- Staff Turnover Rate
- RNs
- LVNs

Dependent variables

- Incidence of ADL decline
- Use of physical restraints
- Prevalence of high-risk pressure ulcers stage 1–4
- Prevalence of low-risk pressure ulcers stage 1–4
- Prevalence of weight loss

Control variables

- Facility size: <60 small, 61-120 medium,>120 large
- Geographic location: rural vs. urban
- Ownership type: for-profit, nonprofit, and government
- Case mix index **(cmi)**
- Resident age

Evaluating the Quality of Medical Care. *The Milbank Quarterly*, Vol. 83, No. 4, 2005 (pp. 691–729).

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Reprinted from the Milbank Memorial Fund Quarterly, Vol. 44, No. 3, Pt. 2, 1966 (pp. 166–203). Style and usage are unchanged.

DEFINITIONS FOR DISSERTATION

Acuity: This term refers to the hours and type of care required by staff as related to each resident's need for nursing care. This takes into account the complexity of the resident's care. Acuity will be measured with the Case Mix Index (CMI) Resource Utilization Group Classification System (RUG III).

ADL decline: ADL decline is measured by the amount of involvement that a resident has in ADL performance, including the amount and type of assistance that the staff provides during a 7-day period. This is more specifically measured as the percentage of residents who meet the definition of late-loss ADL. The Quality Indicator definition is as follows:

Percent of residents whose need for help with daily activities has increased.

Numerator: Percent of residents with worsening (increasing MDS item score) in Late-Loss ADL self performance at target relative to prior assessment. Residents meet the definition of Late-Loss ADL worsening when at least two of the following are true: Bed mobility – Level at target assessment – Level at previous assessment is greater than 0 (independent), or Transfer - Level at target assessment – Level at previous assessment is greater 0(independent), or Eating - Level at target assessment – Level at previous assessment is greater than 0 (independent), or Toileting - Level at target assessment – Level at previous assessment is greater than 0 (independent),

OR at least one of the following is true:

Bed mobility – Level at target assessment – Level at previous assessment is greater than 1 (supervision), or Transfer - Level at target assessment – Level at previous assessment is greater than 1 (supervision), or Eating - Level at target assessment – Level at previous assessment is greater than 1 (supervision), or Toileting -Level at target assessment – Level at previous assessment is greater than 1 (supervision).

Denominator: All residents with a valid target and a valid prior assessment.

Abt Associates Inc. November 2004 (v1.2) 2-4. ***Exclusions*:** Residents meeting any of the following conditions: 1. None of the four Late-Loss ADLs bed mobility, transfer, eating, or toileting, and each of the four have a value of 4 (total dependence) or a value of 8 (activity did not occur) on the prior assessment. 2. The QM did not trigger (resident not included in the numerator) AND there is missing data on any one of the four Late-Loss ADLs on the target assessment or prior assessment. 3. The resident is comatose or comatose status is unknown or missing on the target assessment. 4. The resident has end-stage disease or end-stage disease status is unknown or missing on the target assessment. 5. The resident is receiving hospice care or hospice status is unknown or missing on the target assessment or the most recent full assessment (**Abt Associates Inc., November 2004).** See Appendix 1: Minimum Data Set Tool for further coding instructions.

Case mix: This refers to how residents are classified and grouped together according to acuity needs, medical conditions, functional needs, and other criteria as identified by CMS. The Resource Utilization Group Classification System (RUG III) is the case mix reimbursement system established by CMS that is used to calculate the costs of staff time and resources needed to provide resident care using clinical data obtained

from the MDS. The term *case mix* encompasses more than grouping like resident resource needs together; it also includes how staff will be assigned and utilized to meet the varying needs, as well as how these resources needs compare with those of other long-term care organizations (CMS, 2007).

Centers for Medicare & Medicaid Services (CMS): This federal agency administers regulatory guidelines and oversight for Medicare, Medicaid, and the Children's Health Insurance Program. It was formerly known as the Health Care Financing Administration (HCFA).

Facility size: The number of resident beds housed in a nursing facility. This will be measured by recording the number of resident beds in each facility.

Geographic location: Where a nursing facility is located. This will be defined according to the 2007 Texas Nursing Facility Cost Report Manual and is identified by a 3-digit county code for the Texas County in which the provider facility is located.

Hours per resident day (hprd): Hours of service is determined based on facility-wide hours of care divided by the number of residents. This is the equivalent to services for one resident for one day. The day begins when the resident is admitted to the nursing facility and is counted as a day of service from that point in time. The day the resident is discharged from the nursing facility is not considered in the count for a day of service. To obtain a calculation for the number of nursing hours worked for the purpose of this research, hours of care per resident per day (hprd), the total number of hours worked will be divided by the total number of residents. Hours per resident day are distinguished among staff types by an assigned item number as referenced in the 2007 Texas Nursing

Facility Cost Report Manual. Example: Registered nurse has an identifiable item number only associated with this type of staff and licensed vocational nurse has an identifiable item number only associated with this type of staff.

Incidence rate: A quality indicator that develops over time and is captured in two consecutive assessments. Incidence rate is measured from a combination of the prior and target assessments. Incidence QIs take into account any changes that occur with the resident or change in status between MDS assessments.

Minimum Data Set (MDS): The MDS is the standard assessment instrument that risk residents who have pressure sores: ***Numerator*:** Percentage of residents with pressure sores (Stage 1–4) on the target assessment. ***Denominator:*** All residents with a valid target assessment and any one of the following inclusion criteria: 1. Impaired in bed mobility or transfer on the target assessment as indicated by coding of Physical Functioning and Structural Problems. Comatose on the target assessment as indicated by coding the MDS as such. 3. Malnourished as coded the target assessment (Abt Associates, 2004). (For the purpose of the Quality Indicator definition, the term *pressure sore* is used instead of *pressure ulcer* as noted on the MDS). (Abt Associates, 2004). See Appendix 1: Minimum Data Set Tool for further coding instructions.

Pressure sores (low-risk): Pressure sores (Low risk): Percent of low-risk residents who have pressure sores: ***Numerator:*** Percent of residents with pressure sores (Stage 1–4) on the target assessment. ***Denominator*:** All residents with a valid target assessment and not qualifying as high risk. ***Exclusions:*** Residents satisfying any of the following conditions are excluded from all risk groups (high and low): 1. The target

assessment is an admission assessment; 2. The QM did not trigger (resident is not included in the QM numerator) *and* the value of "pressure ulcer" is missing or has not been coded on the target assessment; 3. The resident does not qualify as high-risk *and* the value Physical Functioning and Structural Problems for the resident's self performance of bed mobility or transfer is missing or has not been coded on the target assessment; 4. The resident does not qualify as high-risk *and* the value for "comatose" which would be an exclusion is missing on the target assessment. (For the purpose of the Quality Indicator definition, the term *pressure sore* is used instead of *pressure ulcer* as noted on the MDS. (Abt Associates, 2004). See Appendix 1: Minimum Data Set Tool for further coding instructions.

Nursing facility: A facility that provides care to residents in need of skilled nursing in addition to other related services.

Nurse staffing mix: The mix of various staff—including those who work in a nursing facility. For the purposes of this study examples include, RNs, LVNs, contract RNs and contract LVNs. Staff is accounted for in this study according to an item number as defined by the Texas Health and Human Services Commission (HHSC).

Ownership: This refers to for-profit, nonprofit, or government status of a nursing home.

Physical restraint: "Any manual method or physical or mechanical device, material, or equipment attached or adjacent to the resident's body that the individual cannot remove easily which restricts freedom of movement or normal access to one's body" (CMS, 2009, p. 3-198). The daily use of a physical restraint was documented as residents who

were physically restrained on the target assessment. Restraints included in this description are trunk restraints, limb restraints, and chair prevents rising. The term *chair prevents rising* includes anything that restricts a resident's ability to rise from a sitting position due to any type of restrictive device or a chair that restricts such movement (Abt Associates, 2003; CMS, 2007).

The Quality Indicator definition is as follows:

Percent of residents who were physically restrained: ***Numerator:*** Percent of residents who were physically restrained daily as coded on the target assessment. ***Denominator*****:** All residents with a valid target assessment. ***Exclusions:*** Residents satisfying the following conditions: 1. The target assessment is an admission assessment; 2. The QM did not trigger (resident is not included in the QM numerator) *and* the value for "Devices and Restraints" is missing on the target assessment or has not been coded on the MDS assessment (Abt Associates, 2004). See Appendix 1: Minimum Data Set Tool.

Pressure sores (high risk): The Quality Indicator definition is as follows: ***Pressure sores—Paired measures:*** Percent of high-risk residents who have pressure sores. ***Numerator:*** Percent of residents with pressure sores (Stage 1–4) on the target assessment. ***Denominator*****:** All residents with a valid target assessment and any one of the following inclusion criteria: 1. Impaired in bed mobility or transfer on the target assessment as indicated by the need for extensive assistance, total dependence, or the activity did not occur, 2. comatose on the target assessment, or 3. suffered malnutrition on the target assessment ***Exclusions:*** Residents satisfying any of the following conditions are excluded from all risk groups (high and low): 1. The target assessment is an

admission assessment; 2. The QM did not trigger (resident is not included in the QM numerator) *and* the value of "pressure ulcer" is missing or has not been coded on the target assessment; 3. The resident does not qualify as high-risk *and* the value Physical Functioning and Structural Problems for the resident's self performance of bed mobility or transfer is missing or has not been coded on the target assessment; 4. The resident does not qualify as high-risk *and* the value for "comatose" which would be an exclusion is missing on the target assessment. (For the purpose of the Quality Indicator definition, the term *pressure sore* is used instead of *pressure ulcer* as noted on the MDS. (Abt Associates, 2004). See Appendix 1: Minimum Data Set Tool for further coding instructions.

Prevalence rate: A quality indicator that is captured at one point in time and is either present or absent. Prevalence rate is measured from the target assessment, which is the assessment closest to the end of the quarter. A prevalence rate is calculated by dividing the number of residents with a particular quality indicator by the total number of residents in the facility.

Quality Measure/Quality Indicator Report: The MDS Quality Measure/Quality Indicator (QM/QI) Report is a CMS report that summarizes, by state, the average percentage of nursing home residents who trigger one of 30 quality measures/indicators, which have 34 subcategories, during a quarter. Quality indicators are triggered by specific responses to MDS scoring and identify residents who either have or are at risk for specific functional problems and require further evaluation (CMS, 2008a). Quality indicators for this study are incidence of ADL decline, use of physical restraints,

prevalence of high-risk and low-risk pressure ulcers stages 1–4, and prevalence of weight loss. (Abt Associates, 2004).

Resident: An individual who lives in a nursing facility.

Staff turnover rates: The percentage or rate of staff lost or no longer employed at a nursing facility at the end of the reporting period. This is defined by the 2007 Texas Medicaid Cost Report. The turnover rate is measured by dividing the number of employees who are no longer employed (total number of W2 forms filed minus the number of employees at the end of the reporting period) by the number of employees at the end of the reporting period (Kash, Castle, & Phillips, 2007).

Target assessment: The most recent (current) MDS 2.0 assessment that has been completed.

Weight loss: Unplanned weight loss can have negative consequences on the elderly and is evaluated at intervals during a resident's nursing facility stay. The prevalence of weight loss is measured as a loss of 5% in 30 days or 10% in 6 months. For the purpose of this study, weight loss includes "unintended weight loss" only.

The Quality Indicator definition is as follows:

Percentage of residents who lose too much weight: ***Numerator:*** Percentage of residents who have experienced weight loss of 5 percent of more in the last 30 days or 10 percent or more in the last 6 months. ***Denominator:*** All residents with a valid target assessment. ***Exclusions:*** Residents satisfying any of the following conditions: 1. The target assessment is an admission assessment; or this information is missing on the target assessment; 3. The resident is receiving hospice care or hospice status is unknown if this

information is missing or has not been coded on the MDS assessment (Abt Associates, 2004). See Appendix 1: Minimum Data Set Tool for further coding instructions.

ASSUMPTIONS

The assumptions made in this study were as follows:

- Data for this research will be accurate and accessible.
- Quality care is an expected outcome for residents who live in a nursing home.
- Staffing levels should be adequate to care for the residents in nursing homes throughout the United States.
- Guidelines and rules established by the Centers for Medicare & Medicaid Services provide a structure by which nursing homes throughout the United States are governed.

LIMITATIONS

Texas was the only state included in this study. The ability to generalize to states other than Texas is limited. Although only one state was included, there are approximately 1,100 nursing homes in Texas from which to draw a random sample (CMS, 2008a). A total of 439 facilities (43%) were excluded from this study due to missing data from the CMS MDS or QI data. Similar research has been conducted in previous studies, and further testing should be completed before making conclusions about how this research can be applied to other populations (Polit & Beck, 2004). There may be limitations related to data entry errors, and it is important that the data is cleaned to reduce the risk of this occurrence. The use of large data sets in general demands close attention to quality, especially in research using secondary data.

The number of RNs in Texas nursing homes was a limitation for this study. The RN hprd average for Texas is lower than the national average, while the LVN hprd

average is higher. In 2007, the national average of RN hprd was 0.6, or 36 minutes in 24 hours, and the national average of LVN hprd was 0.8, or 48 minutes in 24 hours (Kaiser, 2011). Both positive and negative consequences that are associated with both adequate and inadequate RN staffing has been described extensively throughout this study.

Finally, the low percentage of non-profit nursing homes in Texas is a limitation with less than 14% total. The low Texas Medicaid reimbursement rate negatively affects the ability for non-profit organizations to remain active as a viable business given the issues of limiting funding. There are few government incentives to supplement the low reimbursement rates. Many nursing facilities simply cannot afford to remain in business without strong financial backing through other means such as endowments or other funding to sustain viability.

CONCLUSION

There is a great need to continue searching for answers and to fund research that evaluates methods of improving quality of care in nursing homes. Prior research strongly suggests that adequate staffing to meet resident needs is essential to quality of care. Furthermore, previous research indicates that consistently maintaining adequate staffing levels combined with a reduction in staff turnover rate are key elements in addressing quality of care initiatives in long term care. This study will contribute to policy development, affecting legislation at the state and national levels. Furthermore, it should increase the awareness and understanding of staffing issues in long-term care organizations. As argued in the literature, research has established that increasing hours of care provided by a licensed nurse, with an increased emphasis on registered nurses, positively affects quality outcomes.

Chapter 2: Synthesis of the Literature

The purpose of this chapter is to provide the reader with a history of long-term care along with an overview of the long-term care industry, both before and after the passage of OBRA 87, as a foundation for discussing the relationship between staffing levels and quality outcomes. This review begins with a history of long-term care, including initiatives that occurred during the Reagan administration, the passing and implementation of OBRA 87, and present-day issues. In covering this, the discussion will include quality improvement efforts in long-term care, quality indicators, the Minimum Data Set (MDS), and the Medicaid Cost Report. In addition, the development of the Resident Assessment Instrument (RAI) will be discussed, as will its history, purpose, and use in long-term care today and in the future; and the development of the quality indicators will be reviewed specific to their purpose, use, reliability, and validity. An overview of key concepts that are commonly referenced in the literature, such as regulatory oversight, workforce concerns, and staff turnover, will also be provided.

Following that, research related to RNs, LVNs, and contract nurses in long-term care will be reviewed. This discussion will include a summary of current literature related to staffing and its relationship to quality of care outcomes in the nursing home setting, along with issues that are problematic, such as workforce concerns and staff turnover.

In establishing a foundation for the study, Donabedian's framework was identified. Donabedian has provided the most commonly used framework for studies related to quality, since he sets out the model of structure-process-outcome indicators of quality (Donabedian, 1966; 2005). This framework has been used in a variety of ways throughout the literature, including some expanded versions of the model (Abt

Associates, 2003; Collier, 2008; Crickard, 2005; Dellefield, 2006a; Holzemer, 1994; Mitchell et al., 1998; Parsons, 2004; Unruh & Wan, 2004; Adams-Wendling, 2005), and each use applied it differently depending on the variables. Therefore, it is a theoretical framework that can be viewed as an umbrella encompassing the organizational structure of long-term care yet embracing the basics of practice at the bedside that produce various resident outcomes.

The chapter will then provide a review of nurse staffing levels, with an emphasis on regulatory standards as required since OBRA 87 and how these are applied within the nursing home setting. How these nurse staffing levels and case mix/acuity are related to quality of care for RNs, LVNs, and contract nurses will also be discussed. In addition, the Health Care Financing Administration (HCFA) time study will be reviewed in relation to its use for the RUGS III calculation of nurse staffing time and resource use for resident care, and nurse turnover will be addressed in terms of its impact on quality outcomes, as will some of the reasons for turnover and other key issues associated with this problem.

As noted throughout the literature, *quality* and *staffing* do not have one single meaning; rather, they have various operational definitions applied by different researchers and are consequently defined with an array of concepts and terms. Because of the various applications used, the ability to duplicate the research or draw strong conclusions varies and must be considered when looking at staffing and its relationship to outcomes in a nursing home setting. Furthermore, there is variability in how quality is measured among researchers (Adams-Wendling, 2005; Castle, Degenholtz, & Engberg, 2005; Harrington, 2005; Kane, 2003), which has affected the ability to move this body of knowledge forward. This literature does, however, afford the researcher a new view and perspective of the research that will further enhance and promote continued understanding of this broad and diverse topic. It will also allow the researcher to continue

the exploration of numerous concepts, depending on the particular area or focus of research interest.

The systematic review answered three research questions: (1) Which outcomes are considered a priority in the studies reviewed? (2) Is there a relationship between licensed staff and resident outcomes? (3) Which theoretical frameworks are most useful for quality outcomes research in long-term care? A number of data sources were used for the literature review including, the Ebsco Host, Alternative Healthwatch, CINAHL Plus with full text, Health-Source Consumer Edition, Medline, and the Health Source Nursing/Academic Edition.

An expanded literature search was conducted, producing additional resources. Those retrieved include government reports, information from government Web sites, and other current, reliable resources for data on the aging population. The inclusion criteria for primary and secondary searches included studies that (1) appeared in peer-reviewed journals, or (2) were government reports/papers, or (3) were on government Web sites, (4) nursing homes located in the U.S., (5) were published in English, (6) were specific to staffing related to quality, (7) were published between 2000 and 2007 (post–OBRA 87), and (8) regarded nursing homes.

The terms used in searching studies that met the inclusion criteria were *nursing home, long term care, quality of care, quality outcomes, outcomes, decubitus ulcers, falls, environment, nurse, registered nurse, staffing, acuity, case mix, functional decline, functional loss,* and *weight loss*. Key words selected for this review were *nursing homes, nurse, outcomes,* and *staffing*.

Criteria for exclusion precluded (1) studies of nursing homes outside the United States, where cultures and customs may reflect a different set of standards and regulatory guidelines for long-term care, (2) residents with conditions such as end stage disease

which may produce complications including dehydration, pressure ulcers, and weight loss that occur as unavoidable events (Quality Matters, 2004) rather than as a reflection of the quality of nursing care, (3) studies of staff other than licensed nurses (e.g. administrators), and finally, (4) hospitals, and other residential settings such a assisted living, private setting homes or group homes for the aging population that are not licensed as a nursing home. Services as described, are operated and regulated by various regulatory agencies, and do not follow the same guidelines established by CMS for long-term care, and will therefore not provide useful comparative data (CMS, 2008a). Evidence-based article abstracts or summaries were read to determine whether they met eligibility requirements and contained appropriate content. Key information was extracted related to nursing homes, quality, outcomes, staffing, and other associated terminology.

For the focused, systematic review of the relationship between staffing levels and resident outcomes, 49 articles were identified in the search, with 17 meeting inclusion criteria. Studies were examined for staffing levels and mix, staff turnover, quality of care measures or indicators, resident acuity or case mix, and resident outcomes. Quality indicators and quality measures generated from the MDS were used as the primary database for resident outcomes. Resident databases were also reviewed for reliability and validity, including the Online Survey, Certification and Reporting (OSCAR) Reporting System and Texas Medicaid Cost Report.

The 49 articles were narrowed down to 17 studies specific to the relationship of nurse staffing levels to resident outcomes. The articles were published from 2000 to 2007 and reviewed post–OBRA data to determine whether quality improvement had occurred.

Common themes between licensed nursing staff and resident outcomes in long-term care were identified. Examples of negative outcomes noted were pressure ulcers and the high costs of providing resident care. Five of the 17 studies indicated the use of Donabedian's quality framework of structure, process, and outcomes, while others implied its use, chose a different framework, or did not identify a particular theoretical framework.

Post–OBRA: Quality Improvement in Long-Term Care

DEPENDENT VARIABLES: QUALITY MEASURES (QUALITY INDICATORS)

The quality indicators were developed in 1990 by a research team at the Center for Health Systems Research and Analysis at the University of Wisconsin–Madison with the HCFA's Nursing Home Case Mix and Quality (NHCMQ) project. Since the project started, researchers have been testing the quality indicators to determine their reliability, sensitivity, specificity and usefulness for quality improvement in nursing homes. The research team established thresholds for a group of 13 quality indicators and determined that at a particular point in the scoring of the quality indicator, an alert or decision-making gauge would be set. This gauge can be used by nursing home staff to determine whether an indicator score is reflective of a true problem related to quality or simply an alert that an issue needs to be noted and monitored (Rantz et al., 1997; Zimmerman & Karon, 1995).

Karon, Sainfort, and Zimmerman (1999) looked at the stability of the quality indicators over time. The study included 512 nursing facilities from two states, Kansas and South Dakota. Facility-level quality indicators were evaluated based on the

individual indicator. The authors found that 25 of 30 prevalence (a point in time) quality indicators showed correlation coefficients of .80 or greater. This stability is important for facilities with a strong focus on quality assurance and improvement. This attribute allows nursing home staff an opportunity to track and trend important outcome data that is derived from the quality indicator report and monitor the change for improvement over time.

Abt Associates (2003) continued research with the quality indicators. Using Donabedian's framework for structure, process, and outcome, the authors completed a study of 209 free-standing and hospital-based facilities within six states, including California, Illinois, Missouri, Ohio, Pennsylvania, and Tennessee. This team of researchers tested the validity of 20 quality indicators that were observed over a year, from November 2001 to November 2002. They used several methods, including a medical records review (resident level), an MDS subset review by research nurses to be compared later to facility-level MDSs, an administrative survey (facility level), and an environmental observation of the nursing home in general. Inter-facility comparison was carefully controlled through three measures, not including residents who were near death; four quality indicators were tested with additional measures applied, breaking them down into high-risk and low-risk categories; and a statistical regression covariate adjustment was used (Abt Associates, 2003).

In practice, 24 quality indicators are derived from MDS data and are aggregated at the facility, state, and national levels (CMS, 2007). From this compiled data, a quality indicator report is generated for facility and staff use for various purposes, such as care plan creation, education, and policy development. This report requires that facility staff investigate at the resident level to determine if there is an actual or potential quality

concern that needs further investigation, a process that refers to prevalence versus incidence of resident outcomes (Rantz et al., 1997; Zimmerman, 1995).

RESIDENT ASSESSMENT INSTRUMENT: THE MDS IN LONG-TERM CARE

The Resident Assessment Instrument (RAI) is one of several federally mandated assessment instruments developed to collect data about clients in specific health care settings. In long-term care, the RAI is made up of the MDS and the Resident Assessment Protocol (RAP), which are used by the interdisciplinary team to develop the resident care plan. The RAI is also used to outline a process to structure decision making and problem solving for the residents through the development of the care plan. A combination of staff within the organization shares in one or more aspects of the RAI process. This begins with resident observation, assessment, and data collection and then continues from data entry through completion of the MDS. This information is transmitted by computer to the state regulatory agency, and the results of the data entry are utilized by the interdisciplinary team to plan the resident's care. Examples of those who participate in using the MDS and care plan process are nurses, social workers, and dieticians, as well as others. The MDS is also used for reimbursement purposes related to resident care and for quality improvement through use of the quality indicators or quality measures and service eligibility (Fries & Fahey, 2003).

Developed in 1988 as a draft instrument, the MDS is a CMS assessment tool that was originally developed under the HCFA, the federal organization that later became CMS. The team that developed the MDS defined expectations for the future use of this instrument to include ongoing staff education, with a particular emphasis on maintaining quality resident care (Morris et al., 1990). The MDS was developed to serve as a guide and resident assessment model for the future of long-term care.

A licensed nurse completes the full assessment or subset of the MDS items (Hawes et al., 1995) at intervals after admission, continuing through the resident's nursing home stay as determined by the admission date and other pertinent information. In some nursing homes other staff is involved in completing the MDS for example a dietician, social worker, and activity staff. This varies depending on a number of factors for example size of the nursing home (number of resident beds) and number and type of staff employed by the nursing home. The first part of the MDS covers background and demographic information. It is alphabetized by section, beginning with AA and ending with V, and provides valuable information about the resident through a series of questions related to current and past health status. Additional review includes documented improvement, decline, or no change in status (CMS, 2007). The full MDS assessment pulls together current and recent information on each resident that is valuable in care planning and meeting quality of care needs.

As an example of how the MDS is structured and what it addresses, consider Section O—Medications. This section is broken down into four subsets, and each subset asks various questions about the number of medications a resident has used in the last 7 days. It additionally collects information about new medications ordered during the last 90 days, the number of injections given during the last 7 days, and the number of days in the last 7 days that a specific classification of medication was administered. The MDS covers the resident's current physical and psychosocial aspects as well as those present during the time frame prior to admission. After the assessment is completed, the data is transmitted to the state regulatory body through a computerized database (CMS, 2008a).

MEDICAID COST REPORT VS. OSCAR QUALITY SURVEY DATA

Kash, Hawes, and Phillips (2007) found that the Medicaid Cost Report provides valuable information that is related to Medicaid cost centers for RNs, LVNs, nursing assistants, and other staff. Increasingly, the cost report staffing data is accepted for research because of its higher degree of accuracy in comparison with the OSCAR staffing data collected during the annual State quality survey.. In recent years, the cost report has been used in several studies regarding staffing levels and mix (Harrington & Swan, 2003; Kash, Hawes, et al., 2007; Rantz et al., 2004). One study compared the OSCAR with the Ohio Department of Health's data, and a second one looked at OSCAR data and a self-reported survey. The third and most comprehensive study was published by CMS in 2001 and included data from three states—New York, Ohio, and Texas—comparing OSCAR staffing data to Medicaid Cost Report and payroll data (Kash, Hawes, et al., 2007). The results were favorable for the cost report, which had better reliability comparatively. The issue of nursing homes' "staffing up," or increasing staff levels just prior to the survey, was not an issue with the cost report. In addition, these data are subject to audit, and the nursing homes are subject to fines for violations. Any issues of under- or over-reporting of staff time can result in a fine, and these reports can also be audited for a closer look at facility practices if necessary (CMS, 2001; Kash, Hawes, et al., 2007). With continued research to further establish the validity and reliability of the cost report, this instrument has the potential to become the preferred one for staffing and outcomes data.

The OSCAR database, however, and its reliability have been questioned in previous studies (Bostick et al., 2006; Castle & Myers, 2006; Dellefield, 2000, 2006a; Kash, Hawes, et al., 2007; Zhang et al., 2006). One concern is the tendency for providers to increase staffing levels prior to survey, giving a false picture of how staffing truly looks at any given time (Kash, Hawes, & Phillips, 2007). Another concern is the need to

perform data cleaning. According to Dellefield (2000), in one regional office alone, 238 facility reports were removed because of errors or missing data. One example is a facility's reporting a higher resident census than the actual number of resident beds. Data cleaning to identify these discrepancies takes extra time, staff, and resources. Furthermore, this problem can also affect the results of the research by decreasing the overall sample size.

RESIDENT OUTCOMES

ADL Decline

Activities of daily living are a concern to some extent for many nursing home residents. In fact, ADLs are sometimes the reason the aging seek services such as nursing home placement (Maryland Healthcare Commission, 2000). The ability to perform daily tasks that are normally a part of everyday life can change over time or even suddenly, as related to illness or injury. The needs of nursing home residents, including their clinical and functional needs, continue to increase in complexity. Given the growing demands imposed by resident complexity, questions arise about the ability of staff to meet varied resident needs (Feng, Grabowski, Intrator, & Mor, 2006).

Activities of daily living (ADLs) in the nursing home include bathing, eating, dressing, personal hygiene, transferring, ambulation, locomotion such as with the use of a wheelchair, and toileting (CMS, 2007). The documentation of resident activities of daily living by nursing home staff allows the tracking of this data for input into the MDS. Resident ADLs is an effective measure of staff time and is appropriate for a study that is evaluating staffing levels and their association with ADL outcomes For the purpose of this study, the focus will be on four late-loss ADLs, specifically bed mobility, transferring, eating, and toileting (Abt Associates, 2003).

Hicks, Rantz, Petroski, and Mukamel (2004) evaluated the relationship between nursing home costs and quality outcomes—including ADL decline, the development of pressure ulcers, psychotropic medication use, and weight loss—using secondary data. In all, 474 nonhospital-based Missouri nursing facilities were used in this study. The authors found that as the prevalence of pressure ulcers increases and ADL function declines, the cost of care goes up. Although each individual quality measure, evaluated separately, did not make a significant difference in costs, they can make a difference in the overall costs for nursing home care. Another factor considered in this study was risk-adjusted days. This variable explained the largest percentage of costs, which mostly consisted of staff time. This issue is one that must be considered when factoring costs and quality of care outcomes. The authors determined that thoughtful use of resources and creative strategies for addressing quality costs in a nursing home are ways that nursing home administrators or leadership and management staff can best address quality of care issues.

According to Arling, Kane, Mueller, Bershadsky, and Degenholtz (2007), meeting the needs of residents is not only about the number of available staff but also how the staff is used to meet resident needs. This is a multifaceted issue that includes decision making by management and leadership staff in addition to other resources such as technology and staff mix, not just the number of staff and the acuity levels of the residents or case mix. In a study by Horn et al. (2005), resident care and outcomes were evaluated, with 1,376 residents in 82 nursing facilities. RNs, LPNs, and nurse aides provided resident care in increasing increments of time to determine the effect, if any. Specifically, RN care was evaluated at 10-minute intervals. Significant outcomes noted were fewer pressure ulcers developed as the amount of time or care by an RN was increased, as well as a greater use of oral supplements for nutrition, which contributed to

a decrease in resident weight loss. The strongest predictor in the model was decreased worsening of ADLs with RN direct care time in the range of 30 to 40 minutes.

Pressure Ulcers

The cost of pressure ulcers to society is astoundingly high, with an annual price tag in the billions of dollars each year, but the staggering dollar figure does not equate to the pain and suffering, both physical and psychological, that is associated with the ulcers. Identified as a nurse-sensitive outcome, pressure ulcers have been determined to respond to care by nursing staff. This quality indicator has shown an association to care provided by a licensed nurse (Bostick et al., 2006). CMS acknowledges pressure ulcers with a distinction of high-risk pressure ulcers and low-risk pressure ulcers. This is further described as the prevalence of high-risk and low-risk pressure ulcers in stages 1–4, which is measured during the target assessment period. To be classified as being at high risk for a pressure sore, a resident must meet at least one of three criteria: (1) impaired mobility or transfer, (2) comatose, or (3) suffers from malnutrition. To be classified as being at low risk for a pressure sore, a resident must have a pressure sore that is stage 1–4 and not be qualified in the high-risk group. This distinction will be drawn throughout this study as it relates to CMS and as defined by the National Nursing Home Quality Measures User's Manual (Abt Associates, 2003; CMS, 2008c).

Ten studies (Bostick, 2004; Dellefield, 2006a; Dorr et al., 2005; Gray-Siracusa, 2005; Harrington, Zimmerman, et al., 2000; Hendrix & Foreman, 2001; Horn et al., 2005; Wan et al., 2006; Weech-Maldonado et al., 2004; Zhang et al., 2006) evaluated staffing levels, cost, and turnover related to the prevention, development, and worsening of a pressure ulcer. According to Zhang and Grabowski (2004), the cost of pressure ulcer care can exceed the cost of nursing staff who oversee the processes of care and work to reduce

the risk of skin breakdown. This is an important factor when considering the financial impact of prevention and treatment of pressure ulcers (Horn et al. 2004; Smith, 1995).

Some long-term care providers, key stakeholders, and researchers argue that the need exists for increased numbers of staff who are educated in providing care to the aging and have an understanding about quality care (Adams-Wendling, 2005; Bostick et al., 2006; Hawes, 2003; Shipman & Hooten, 2007). Central to this argument are the significant cost of pressure ulcer care and the importance of pressure ulcer prevention. A staff that is consciously aware of the basics of care in pressure ulcer prevention and that works to identify residents who are at risk for pressure ulcers would be a major benefit in this effort. Staff must act to prevent ulcers by increasing oral fluids, protein, vitamins, and intake in general. Toileting residents in a timely manner, providing incontinent care, consistently turning and repositioning those individuals with functional impairment, and using care practices that promote skin integrity must be priorities. Another extremely important factor is promoting teamwork among staff that provide resident care, including nurses, nurse aides, and other direct care staff. No one person can be singled out and credited for pressure ulcer prevention or blamed for pressure ulcer development as this issue requires a combined effort by various staff. Pressure ulcer prevention requires diligence from the interdisciplinary team on a continual basis (Hiser et al., 2006).

Physical Restraints

Physical restraints and quality of care have been evaluated in articles, reports, and studies in various ways, such as to determine the impact of OBRA 87, to examine and report on the extent of continued use, and to identify various outcomes of use—for example, negative consequences such as depression or decreased physical function (Grabowski, Angelelli, & Mor, 2004; Letizia, Babler, & Cockrell, 2004; Sullivan-Marx,

Strumpf, Evans, Baumgarten, & Maislin, 1999; Weech-Maldonado et al., 2004; Zhang & Grabowski, 2004). Although there has been documented evidence of improvement since the passing of OBRA 87, a concern still exists that the effort to reduce and eliminate the use of physical restraints has not attained consistent success throughout the United States and that education related to the dangers and risks associated with restraint use must continue (GAO, 2005; Hawes et. al, 1997; IOM, 2001; Turnham, 2001).

In a study by Sullivan-Marx et al. (1999), the use of physical restraints in a nursing home was evaluated to identify predictors of continued use after efforts were made toward restraint reduction. A total of 292 residents were included in the analysis, with 19 restrained over the course of observation. One observation was that as the number of licensed nurses increased, particularly licensed practical nurses in comparison to the number of nurse aides, restraint initiation increased. Another observation was that the residents who most often had a restraint initiated were those with cognitive impairments. However, physical restraint education provided by a clinical nurse specialist was determined to be a preventive measure that could be used to decrease the risk of restraint initiation. Education and specific interventions aimed at raising staff awareness and helping them to learn safe alternatives to restraint use were also determined to be good choices and wise investments. Education was also identified as a way to address resident safety and found to be an important part in the continued efforts toward the goal of restraint elimination.

The use of physical restraints has been scrutinized since OBRA 87 as it is a safety concern and a dignity issue for residents who are subjected to it. Most physical restraint devices restrict body movement or access in some way and can potentially pose a risk of death. In addition, physical restraints have been associated with increased risk for pressure ulcers, depression, and physical decline. Staffing levels and the changes that

have been implemented since OBRA 87 and the Nursing Home Reform Act (NHRA) have made a difference in the quality and oversight of care, positively affecting the use of physical restraints and other areas (Zhang & Grabowski, 2004).

The long-term care industry in Texas has made progress in physical restraint reduction over the years since the passing of OBRA 87; however, it has not sustained a decrease to a level of less than 5%. In a report of deficiencies by state, Harrington, Carrillo, and LaCava (2006) said that the nursing home average for physical restraint use in a Texas facility was the same as the national average of 6.9%. This figure does not meet with the expectations of the State of Texas Quality Monitoring Program, administered through the Texas Department of Aging and Disability Services, where the goal is to decrease the percentage of prevalence of restraint usage to less than 5%.

The reasons cited for continued use of restraints in Texas have been related to the staff's belief that they are keeping the residents safe, specifically related to falls and wandering (Texas Department of Aging and Disability Services, 2009). While the staff's use of restraints in nursing homes is not intended to cause residents harm, it is imperative that staff education is emphasized. Through education, restraint reduction and ultimately elimination are goals that can be obtained and sustained over time. Staff education must place greater emphasis on the dangers that physical restraints pose to the general welfare and safety of residents. In turn, the staff can work with families to help them understand the reasons for eliminating restraints and work in partnership with them to accomplish this important goal.

Unintended Weight Loss/Malnutrition

Having adequate numbers of staff to provide basic care such as assisting with eating and drinking is an ongoing issue in long-term care. Catherine Hawes, PhD, has

argued this point before the U.S. Senate Committee on Finance (Hawes, 2003). On one such occasion, the argument was related to how the staff feels when they are forced to work with fewer staff than are needed. Witnessing the openness of nurse aides expressing their dissatisfaction with insufficient staff is a sobering experience. This testimony was expressed in terms that would get the attention of any individual who understands the seriousness of the issues of staffing shortage and how this continues to be an unresolved dilemma.

Unintended weight loss and malnutrition are serious issues in long-term care, as seen in numerous studies (Bostick et al., 2006; Dyck, 2007; Kayser-Jones, 2002, 1997; Shipman & Hooten, 2007). Bostick et al. (2006) published a systematic review of the literature that summarized 87 research articles published from 1975 to 2003. The authors evaluated and summarized outcomes research in long-term care specific to staffing and resident outcomes. From this review, the most sensitive resident outcomes related to staffing were identified as pressure ulcers, functional decline, and unintended weight loss.

The literature asserts that supervisory oversight in a leadership role by nursing staff, especially an RN, is an important focus for weight maintenance and the risk of unintended weight loss, as it continues to be a recurring theme throughout quality outcomes research related to staffing and the need for adequate numbers of staff. In 2007 Dyck completed a secondary analysis using the MDS and OSCAR to evaluate the relationship between nurse staffing and the resident outcomes of unintended weight loss and dehydration. Six states were included for data—Ohio, Indiana, Illinois, Michigan, Wisconsin, and Minnesota—with 363,895 residents from 2,951 nursing homes. While increased hours of care provided by a nursing assistant reflected a decreased chance for unintended weight loss, RN leadership was again noted as much needed for nursing home staff to focus on areas of improvement (Kayser-Jones, 1997; Dyck, 2007). Study results

showed a reduction in weight loss for residents when supervision or leadership oversight was provided by licensed nursing staff who had received education aimed at understanding how to adequately assess a resident's nutritional needs and the impact this understanding has on overall nutrition and hydration.

Additionally, it illustrated how supervisory oversight by licensed nursing staff allows the nurse aide access to staff knowledgeable about resident nutrition during mealtime. This is also an opportunity to observe how the nurses interact with the residents during mealtime. Dyck (2007) says that, in addition to the nurse's supervision, adequate numbers of nurse aides are necessary to assist with feeding and helping with mealtime duties. The focus on teamwork, including key members of the interdisciplinary team, is vital for overall nutritional improvement and is an important part of this issue. Furthermore, this benefit allows the nurse an opportunity to demonstrate appropriate responses to the residents' nutritional needs and provide other communication that may improve the mealtime experience. This is advantageous to both the residents and staff, thereby improving the residents' nutritional status. RNs must begin to demonstrate this leadership in the nursing home consistently so that practices that have become complacent and seemingly less important over time take priority and are acknowledged as necessary.

Kayser-Jones (2000) wrote about the common issues of mealtime feeding in a nursing home and associated concerns. This particular study evaluated 82 residents, and 45 were found to have some degree of dysphasia, or swallowing difficulty. Such issues as these lead to malnutrition and weight loss. The author goes on to say that this is an interdisciplinary concern that needs to be approached by a variety of individuals. According to Kayser-Jones (1997), nursing assistants need leadership and oversight to understand the importance of feeding the elderly, be aware of problems or concerns such

as difficulty chewing and swallowing, and receive education on a regular basis related to these issues. This includes stakeholders who can bring varying degrees of expertise and knowledge to address this issue, such as the physician, nursing staff, a dietician, a speech pathologist or specialist who can work with swallowing disorders, and others as needed.

In a public policy report by Shipman and Hooten (2007) described issues similar to those reported in the Kayser-Jones (2000) article with regard to malnutrition and staff oversight at mealtime. The authors detail grim examples of inadequate staff, citing a government report by Pear (2002) in which it was reported that 9 out of 10 nursing homes in the United States lack sufficient staff to provide adequate care. Shipman and Hooten discussed concerns about the lack of care and oversight by nursing staff, especially RNs. Some of this concern is related in general to the lack of oversight in various processes of care provided by nurse aides, such as in assisting with feeding and providing hydration to nursing home residents. These issues are viewed as epidemic and pose an ethical dilemma that is serious and must be addressed. Furthermore, these issues reach national proportions and demonstrate that the health care profession must take on an advocacy role. Nurses must recognize these issues as an ethical and moral dilemma, as well as other stakeholders who witness the difficulties imposed by the lack of adequate staffing levels in nursing homes.

REGISTERED NURSES IN LONG-TERM CARE

Staffing and its association with resident outcomes have been studied closely over the past several years, and the motivation to perform such studies continues to gain momentum. For this study, it is important to make the distinction between RNs and LVNs as noted. A growing body of research shows that increased numbers of licensed nurses on staff, particularly RNs, have a positive influence on resident outcomes (Castle

& Myers, 2006; Decker, 2006; Hendrix & Foreman, 2001; Horn et al., 2005; Weech-Maldonado et al., 2004). In a study of staffing patterns and quality of care, Weech-Maldonado et al. (2004) identified positive resident outcomes resulting from direct care in a nursing home. The results indicated an initial increase in cost for RN time because of the higher salary expenditure; however, indirect savings became evident over time, such as fewer supplies used for pressure ulcers and other savings as care processes improved. The general oversight of resident care by an RN was identified as a contributing factor to positive outcomes in this study. Gray-Siracusa (2005) found similar results related to LVNs in a study that evaluated acuity in long-term care. RNs were associated with a decrease in weight loss, number of bedfast residents, and pressure ulcers, while LVN staffing was associated with an increase in urinary tract infections.

Research has established that placing an RN in any role in a long-term care setting, including direct care, is an effective strategy for improving processes of care and resident outcomes. Furthermore, the contribution of RNs in positions of leadership where they have an opportunity to serve in the role of mentor is invaluable. Although there has been an enormous amount of work in this area of research to date (Castle & Myers, 2006; Decker, 2006; Dellefield, 2006a, 2006b; Dorr et al., 2005; Harrington & Swan, 2003; Harrington, Zimmerman, et al., 2000; Hendrix & Foreman, 2001; Horn et al., 2005; Shipman & Hooten, 2007; Weech-Maldonado et al., 2004; Zimmerman et al., 2002), there is a need for further research that moves this issue forward through legislative channels.

Three studies evaluated the cost of care by looking at the financial impact on providers of care and society in general. Specific areas evaluated include the high cost of care, such as the costs of hospitalization or urinary tract infections, versus the increased costs of providing extra RN staffing. Research findings suggest that having fewer staff to

provide care, particularly fewer RNs, may contribute to poor clinical outcomes such as decubitus ulcers and has a negative financial impact compared with the cost of providing good care. Care provided by a licensed nurse was factored into the savings for services that offset the reduction in the costs of pressure ulcer care, medical supplies, and hospitalization. The improvement in resident care provided by an RN was related to a decrease in negative outcomes and ultimately a societal savings in health care costs (Dorr et al., 2005; Hendrix & Foreman, 2001; Rantz et al., 2004).

Dorr et al. (2005) completed a retrospective study presenting a cost analysis of RN direct care time. Low staffing versus adequate staffing and the association to three outcomes—pressure ulcers, urinary tract infections, and hospitalizations per resident per day—were measured to see what effect, if any, the staffing variables had on the three outcomes. The sample included 1,376 residents in 82 nursing homes throughout the United States. The amount of time an RN spent providing resident care was increased by 10-minute increments, and outcomes were documented as the time increased. The results were significant, with a societal financial benefit of $3,191 per resident per year where adequate RN staffing was provided.

Hendrix and Foreman (2001) completed a secondary analysis to examine the effects of staffing levels and mix on quality in more than 12,000 nursing facilities using data from 1994. Results showed that while RNs and nurse aides reduce the costs of decubitus ulcer care, staffing with LPNs has a negative outcome, increasing the cost of decubitus ulcer care. Furthermore, the additional education that an RN receives, which is not obtained by an LPN, may provide for effective oversight. The ability of RNs to draw on critical thinking skills and to think in terms of theoretical concepts broadens the depth of decision making and provides more stable oversight of other staff under their leadership.

LICENSED VOCATIONAL NURSES IN LONG-TERM CARE

LPNs or LVNs were associated with negative outcomes or findings in 10 out of 18 studies (Bostick, 2004; Castle & Myers, 2006; Decker, 2006; Dellefield, 2006a; Dorr et al., 2005; Gray-Siracusa, 2005; Hendrix & Foreman, 2001; Horn et al., 2005; Zhang et al., 2006; Harrington, Zimmerman, et al., 2000). Examples include increased deficiencies, increased cost of pressure ulcer care, possible worsening of clinical outcomes, and increased incidence of urinary tract infections, to name a few (Castle & Myers, 2006; Gray-Siracusa, 2005; Hendrix & Foreman, 2001).

According to the U.S. Department of Labor's Bureau of Labor Statistics (2008), most programs for LPNs and LVNs last approximately one year and are taught at a community, technical, or vocational school. With only one year of training, much of what the LPN/LVN learns is basic education that does not delve into critical thinking skills. Unfortunately, one-year licensed nurses, nurse aides, and other direct care staff do not always receive the mentoring or hands-on training that is so greatly needed (National Citizens' Coalition for Nursing Home Reform, 2008) and could benefit from additional education and training (Dyck, 2007; Hawes, 2003; IOM, 2001; Mezey & Harrington, 2006; Mezey, Mitty, & Burger, 2008; Shipman & Hooten, 2007).

LPN/LVNs are used in various ways depending on the health care setting and needs of the clients or recipients served. In long-term care, where few RNs are employed, the use of LPNs/LVNs is much greater than in other health care settings, and these nurses are given more responsibility for directing the care of the unit and the staff. In nursing homes, they oversee other staff such as nurse aides and direct care staff and may be in charge of a nursing unit. Making decisions in these settings often necessitates utilizing the expertise or critical thinking skills of an RN who is on site or on call.

Over the next 8 years, the rate of growth for the employment of one-year licensed nurses is expected to increase to 14%, the largest increase of all occupations. The primary reason for this growth spurt is the increased need for long-term care services in response to the growing population of older adults (CMS, 2008c; Eljay, L.L.C., 2008; Feder et al., 2000; Kaiser Commission, 2006). The increased number of clients brings about greater demand for aging services (National Citizens' Coalition for Nursing Home Reform, 2008).

Because LPNs/LVNs receive only one year of training, additional education specific to geriatrics and aging could be beneficial and contribute to the improvement of resident outcomes in long-term care. In fact, some research has shown improvement in outcomes for health care workers who received education specific to the geriatric population (Kovner, Mezey, & Harrington, 2000), with some residents' functional and psychosocial statuses improving. While some nursing and health care programs do require a course in geriatrics, these are minimal compared with the overall program and are not sufficient to prepare a nurse for the expectations of long-term care nursing. These points shed light on some of the differences in how RNs provide care compared with LPNs (Bostick, 2004; Cohen & Spector, 1996).

CONTRACT NURSES IN LONG-TERM CARE

Contract nursing staff are licensed nurses who fill an open position at an institution. These nurses provide clinical services that are necessary because negative outcomes could result if they are not provided and it is necessary to meet regulatory requirements at the state and federal levels (Texas Health & Human Services Commission, 2007). The use of agency or contract nurses in long-term care is a concern and a serious issue that continues to grow in importance. Additionally, the use of

contract, or agency, nurses in long-term care affects the continuity and quality of care for the residents of nursing homes. As staff leave long-term care positions for various reasons and hiring of new staff lags, vacancies increase, leaving staff positions unfilled. While these positions are open, the nursing home residents remain, needing someone to care for them. This void too often leads to the use of agency staffing (Castle & Myers, 2006; Bourbonniere et al., 2006).

The concern that seems to be at the root of the need to use agency nurses is the shortage of regular employed staff, creating ongoing turnover. Staff turnover is prevalent in the long-term care industry and is a present concern that continues to be addressed in the literature (Bostick, 2004; Castle & Engberg, 2006; Decker, Matthews-Martin, Dollard, Tuckner, & Bizette, 2003; Kash, Castle, et al., 2007). With regard to staff shortages, the issue of turnover rate has not gained the degree of attention to date that it warrants, although it is a concern for many providers, families of residents, and other stakeholders. Studies on turnover of nursing staff have been published, but there is still little research regarding turnover specific to quality and resident outcomes or the relationship between staff turnover and quality of care (Castle & Myers, 2006).

In a study that researched the use of contract nursing staff in nursing homes, Bourbonniere et al. (2006) looked at more than 176,000 OSCAR survey records from more than 15,000 facilities throughout the United States. The authors developed a longitudinal file for a period of 10 years, 1992–2002. Of particular interest were the percentage of deficiency citations and the percentage of contract RNs and LPNs who worked during this time frame. The authors evaluated the relationship between the top quartile of the annual intrastate distribution of health care deficiency citations and the use of contract nursing, taking into consideration both RNs and LPNs. The findings were

significant for an increased percentage of deficiency citations in relationship to those facilities that used a higher percentage of contract nurses over the 10-year period.

Castle and Engberg (2008) continued research in the area of contract nursing, recently publishing a study in which staffing levels and nursing home quality were evaluated. The authors argue that staffing levels are not of significant value without including additional measures that also affect quality of care. One example is evaluating how resident care is provided in the nursing home. The authors argue that the amount of time spent providing care is not the only important factor in relationship to quality of care outcomes and therefore caution that continued work with increased specificity is imperative for future research.

Stabilizing the workforce with the implementation of creative ideas about attracting new staff through recruitment and retention efforts is critical to the future of long-term care nursing. This issue must be approached from a variety of angles and by all stakeholders. This is not just a nursing home issue; it is a social issue that reaches into the lives of families throughout the United States.

NURSE TURNOVER IN LONG-TERM CARE

Staff turnover is apparent in long-term care for RNs, LVNs, nurse aides, and other direct care staff, and the issue has received widespread attention over the past several years as researchers gain knowledge regarding trends and practices in long-term care turnover rates. More is being revealed in government reports and other published articles. Staff turnover, which is commonly defined as the number of staff who leave employment in a nursing home (usually calculated for one year) divided by the average number of staff (CMS, 2001), is costly for the employer, but more important, it has a negative impact on resident outcomes, extending costs into quality of care and quality of life. Staff

turnover detracts from an already burdened workforce, increasing further instability and greatly affecting the continuity in resident care (CMS, 2001; IOM, 2004). The nursing home staff that continues to work and take on more because of the staff shortage continuously struggles with the negative issues associated with staff turnover. The results of turnover are also a reminder that care is not being provided to the expectation of the resident, family, provider, or general public. Consequently, staff turnover is a major concern for nursing home care providers much of the time.

A survey completed by the American Health Care Association (AHCA) found that the turnover rate for long-term care staff across the United States in 2002 was approximately 50% across job categories except for that of nursing assistants, in which it was greater than 70%. Vacancies in licensed nursing staff, including RNs and LPNs, related to staff turnover were greater than 39,000 positions. This study included directors of nursing, RNs, LPNs, and certified nursing assistants (CNAs) in long-term care (Decker et al., 2003).

In a study that examined organizational characteristics and their relationship to staffing levels for RNs, LPNs, and CNAs and staff turnover Castle and Engberg (2006) focused on eight variables: staffing levels, top management turnover, resident case mix, facility quality, ownership, chain membership, size, and Medicaid census. Secondary data was used, drawing from three data sources for 2003 and 2004, including a nursing home survey conducted by nursing home administrators in 2003, OSCAR data for 2004, and the Area Resource File (ARF) for 2004. Six states were included in the sample of 854 nursing home facilities—Missouri, Texas, Connecticut, New York, Pennsylvania, and New Jersey. The researchers found that turnover rates for one year ranged from 35% to 56% for RNs, LPNs, and CNAs. Furthermore, it was noted that four of six organizational

variables were associated with staffing turnover, including lower staffing levels, lower quality, for-profit ownership, and a higher number of beds (Castle & Engberg, 2006).

Bostick (2004) evaluated the association between staffing hours and six quality outcomes—incontinence, late ADL decline, use of physical restraints, pressure ulcers stages 1–4, problem behaviors toward others, and weight loss—using secondary data in a cross-sectional descriptive survey study of Missouri nursing homes. The MDS and OSCAR were used, with staffing data drawn from the OSCAR and resident outcomes data drawn from the MDS for 1999–2000. A final sample of 413 nursing homes with 39,636 residents was used for data analysis. Research results showed that the number of RN hours was significantly associated with the prevalence of pressure ulcers. Additionally, in nursing homes with a greater number of hours of care provided by an RN, the risk of pressure ulcer development was less. In looking at how this is converted into quality outcomes, comparable nursing homes reflected a 3% decreased risk of pressure ulcer development for each additional 6 minutes of care provided by an RN. Interestingly, LPN hours reflected the opposite results; with all variables held constant, a 6-minute increase in time provided by an LPN was associated with one resident having a 3% increased risk of developing a pressure ulcer and a 2% increased risk of developing late ADL decline.

Addressing another aspect of turnover, a study conducted by Chou, Boldy, and Lee (2002) argued that high workload is associated with low job satisfaction, which in turn negatively affects staff turnover. Turnover rates have also been associated with low wages and lack of employee benefits or staff programs (CMS, 2001). Interestingly, one factor associated with high nurse aide turnover was professional staff turnover by RNs (Brannon, Zinn, Mor, & Davis, 2002), and a factor associated with low staff turnover was working for nonprofit organizations.

Key factors have been identified as contributors to a lower percentage of staff turnover. First, demonstration of leadership qualities and the ability to recognize the value of employees and acknowledge their importance are important attributes of management staff. Furthermore, a key factor in addressing staff retention is the ability of leadership to empower and inspire staff to achieve their professional goals after helping them identify those goals. The importance of staff appreciation and recognition was identified in the literature. A second issue identified was the ability of the leadership to recognize the staff in the same way the residents are recognized, through efforts of respect and gratitude. A third key issue that was identified was people-friendly human resource policies, including salary, benefits, work schedule, and the opportunity for upward mobility with resources such as a career ladder for advancement. Last, the literature identified the need for a motivational environment in which adequate staffing is deemed significant for providing high-quality resident care and for staff satisfaction (CMS, 2001).

Many areas have been discussed with regard to decreasing staff turnover and improving the quality of care for the residents and quality of life for the employees. As the problem of staff turnover continues, the staffing shortage increases in complexity, further contributing to poor resident outcomes. Solutions that effectively address staff turnover should in turn address the issue of staff shortage and contribute to a stabilized workforce.

NURSE STAFFING AND ITS RELATIONSHIP TO OUTCOMES IN A NURSING HOME SETTING

OBRA 87 mandates that a minimum standard of care be met for all residents of nursing homes (Turnham, 2001), and nurses and other staff who work in long-term care are the ones expected to meet this minimum standard. Although some nursing homes

exemplify the intent of OBRA, others fall short and continue to provide substandard care. As demonstrated previously, quality of care in nursing homes has been associated with staffing issues—most commonly with staff shortages (Bostick, 2004; Harrington, 2005; IOM, 2001; Shipman & Hooten, 2007). Bostick et al. (2006) identified three nurse-sensitive resident outcomes linked to staffing—functional ability, pressure ulcers, and weight loss. Other research has resulted in similar findings showing that these quality indicators are positively affected by an increase in care provided by a nurse or by an increase in the expertise of care (Harrington, Zimmerman, et al., 2000; Hicks et al., 2004; Hutt, Lin, & Kramer, 2000; Martau, Lin, & Kramer, 2000). When nursing homes work with fewer staff than is necessary to adequately meet resident needs, negative outcomes such as pressure ulcers and weight loss occur (Horn et al., 2005).

Medicare- and Medicaid-certified nursing homes are required to provide the services of an RN in the role of director of nursing; have an RN on duty 8 hours daily, 7 days per week; and have an RN or LPN on duty for each shift (Harrington, 2005; Omnibus Budget Reconciliation Act of 1987; Zhang et al., 2006). (There are inconsistencies in how levels of nurse staffing are defined; however, a commonly used measure is hours per resident day, or hprd [CMS, 2001].) Additionally, nurse aides are required to have a minimum of 75 hours of training. However, there is currently no regulation specifying a minimum ratio of nurse aides to residents. None of the staffing standards described considers nursing home population. The same staffing standards apply across nursing homes of any size, large or small (Zhang et al., 2006).

A great deal of time has been spent researching the issue of staffing levels and what is appropriate to meet the needs of the aging population (Harrington, Zimmerman et al., 2000, 2005; Kramer & Fish, 2001; Omnibus Budget Reconciliation Act of 1987; Schnelle, Simmons, Harrington, et al., 2004; Schnelle, Simmons, & Cretin, 2001; Zhang

et al., 2006). Harrington, Kovner, et al. (2000) made recommendations that were specific to the number of full-time equivalents for each type of staff, including administrative nursing staff and direct care staff. Reports published in both 2000 and 2001 by CMS and Abt Associates described a point at which there is no additional benefit gained in resident care by increasing the number of nursing staff. This cap or end point was determined to be .75 hprd for RNs in long-term care; .55 hprd for licensed staff; and 2.8-3.2 hprd for nursing assistants. This analysis was based on the maximum numbers of staff and did not account for staffing that falls below a given point; therefore, a level for serious outcomes related to staffing could not be determined. Further recommendations were made regarding nurse practitioners in nursing homes with 100 beds or more, the educational requirements for the director of nursing in a nursing home, and nurse aides and continuing education requirements.

Between 2002 and 2003, the Long Term Care Institute (LTCI), a not-for-profit organization that works with quality improvement needs of long-term care providers, took a step toward defining a nurse staffing taxonomy. Over the course of a year, this organization made 48 site visits to nursing homes across the United States. A major focus of each site visit was identifying specific staffing issues related to resident outcomes, and valuable information was gathered about staffing practices in the long-term care industry. The LTCI found that 92% of the homes visited did not have a formal procedure in place to adjust staffing levels when needed and also did not include staffing as a significant factor in the quality monitoring process (Reilly et al., 2006).

A quality monitoring process must be in place to identify how well resident outcomes reflect the facility's staffing levels, what is working, and what needs to be improved in the staffing process. However, establishing guidelines that require nursing homes to follow such a process has proven challenging. Although research exists specific

to the relationship of nurse staffing to quality outcomes, making a case for legislation has been slow with inconsistent findings across studies to date.

Resident Acuity (Case Mix)

Resident acuity was a common theme identified in the literature and merits further investigation to determine how staffing levels or numbers of staff, along with staff mix—using RNs, LVNs, and contract nurses—can best support resident care and acuity levels as they change (Gray-Siracusa, 2005; Harrington & Swan, 2003; Konetzka, Yi, Norton, & Kirkpatrick, 2004; Wan et al., 2006; Zimmerman et al., 2002). While some residents require only minimal care, others have extensive care needs. Resident acuity increases with each additional skilled need and heightens the need for the particular services of a licensed nurse. Resident acuity in long-term care is one piece in the constant juggling act carried on by nursing administrators and managers in their effort to provide enough staff to care for those who require more services or care. This ongoing issue still has no related mandates or guidelines, although recommended in government studies and reports (IOM, 1996, 2001, 2004), to ensure that a set standard is consistently met.

RNs who oversee the processes of care on a daily basis must be aware of the changing acuity needs of the resident population at all times and adjust to them on an as-needed basis. This requires thoughtful consideration, planning, and the ability to stay in tune with the clinical and psychosocial needs of each resident at all times. What is true for one day may not be true for the next in terms of care needs, and this must be considered when looking at staffing resources and resource allocation (Gallagher, 2000). Sicker residents require more staff time, an increased level of care, and increased services. However, a risk-adjustment process allows the health care provider to account for a resident's pre-existing condition, which prevents the assumption that negative

outcomes are a result of the provider's care services (Arling, Karon, Sainfort, Zimmerman, & Ross, 1997; Harrington, Carrillo, Mullan, & Swan, 1998; Kovner et al., 2000; Mukamel, 1997).

The Resource Utilization Group classification system (RUG III) is the case mix reimbursement system established by the CMS that is used to calculate the costs of staff time and resources needed to provide resident care using clinical data obtained from the MDS. The term *case mix* encompasses more than grouping like resident resource needs together; it also includes how staff will be assigned and utilized to meet the varying needs, as well as how these resource needs compare to those of other long-term care organizations (CMS, 2007). However, accuracy in evaluating resident acuity has continued to be a concern—one issue being the questionable accuracy of the MDS as errors in data entry have the potential to negatively affect data collection. Data cleaning is one way to ensure accurate data and work through such issues (Dellefield, 2006a).

The RUG III classification system was tested in the early 1990s in six states, using the amount of staff time needed to provide care (Fries et al., 1994; White, Pizer, & White, 2002). Criteria for care provided were based on the residents' physical functioning abilities, diagnoses, various health conditions, and treatments administered based on the MDS data entry (White et al., 2002). RUG III was first used in 1998 after the Balanced Budget Act of 1997 set forth changes in how the Medicare payment system would be managed. As change occurred for Medicare, a resident classification system became necessary in order to adjust for various services and levels of resident acuity.

Location: Rural vs. Urban

Facility location is frequently addressed in long-term care research and reports (Bolin, Phillips, & Hawes, 2006; Feng, Grabowski, Intrator, Zinn, & Mor, 2008; Phillips,

Hawes, & Williams, 2004) and is often considered a control variable in studies, although there has not been extensive research to evaluate it. What has been evaluated produced mixed results. According to Bolin et al. (2006), the acuity levels of patients admitted to rural nursing facilities are lower than those of patients admitted to urban facilities. A clear explanation for this finding has not been found to date, but even without a full explanation, some researchers drew conclusions about it in research findings. First, in a rural nursing facilities sample of 10% of the admissions across the United States, the number of Medicare admissions was lower, with less attention to staffing to meet higher acuity levels. The question that warrants further research is, Why is this an issue in rural nursing homes? Is the issue related to the elderly people in these rural areas choosing to not go to the hospital, or is it a systematic issue related to access to services? Researchers should continue to delve into the matter in order to better understand the role location plays, how this issue can be best presented in terms of a political agenda, how it can best serve the needs of the aging population across the United States.

Facility Size

Facility size has continued to gain recognition in research as an area that needs to be evaluated in terms of quality of care and outcomes in a long-term care setting. This is true not only for resident outcomes but also for staff and others associated with the nursing home environment. Smaller nursing homes, as determined by number of beds, have been noted as having a positive influence on resident outcomes (Kim, Harrington, & Greene, 2009; Kane et al., 2007; Rantz et al.,2007; Ragsdale, & McDougall, 2008). Most often, the distinction is made by assigning nursing homes to one of three categories: fewer than 60 beds for smaller homes, 60–119 beds for medium-sized homes, and 120 beds or more for the largest homes.

Kim et al. (2009) evaluated RN staffing levels and quality of care in California nursing homes in a longitudinal analysis—specifically determining whether homes were meeting the standards of practice by studying their deficiency citations. Two groups of nursing homes were included, with 201 in one group and 210 in the other. Results showed that nursing homes with fewer than 60 beds received fewer deficiency citations than larger nursing homes. In 2007, Kane et al. completed a study evaluating a model of care that has gained recognition over the past several years called the Green House. This model holds promise for positive outcomes for residents and staff. Although it is licensed by CMS, it houses only 8 to 10 "elders." Although the term *resident* is frequently used in nursing homes and similar long-term care settings, the term *elder* is used in the Green House model with the intent of placing an emphasis on dignity, respect, and attention to those who dwell in this setting. This model offers not only a home with fewer beds but also private rooms and bathrooms and a homelike atmosphere. Kane et al. (2007) found that quality of life was greater in the Green House than in the traditional nursing home setting.

According to Rantz et al. (2004), in a study that looked at quality, cost, staffing, and staff mix in 92 nursing homes in Missouri, the number of beds in a facility was a determining factor associated with quality of care. Homes that most often demonstrated positive outcomes were smaller, most often with 60 beds or fewer, compared with those nursing homes that did not reflect quality outcomes and had a median size of 120 beds. The authors note that an explanation for better outcomes in the smaller nursing homes may be the staff's ability to get to know the residents and their families over time. Another explanation is that direct care staff in smaller homes have assignments with the same residents, so they become more familiar with particular likes, dislikes, and other routine matters of care.

Ownership

Various researchers have evaluated ownership as a structural variable related to quality and staffing in long-term care. For this study, five articles used were Harrington, Woolhandler, Mullan, Carillo, and Himmelstein (2001); Zimmerman, Gruber-Baldini, Hebel, Sloane, and Magaziner (2002); Harrington and Swan (2003); O'Neill, Harrington, Kitchener, and Saliba (2003); and Castle and Engberg, 2006. Harrington et al. (2001) examined all nursing homes in the United States in 1998 to determine if a home's being owned by investors had an impact on quality of care. More than 9,000 (66%) nursing homes at the time were investor owned, while fewer than 4,000 (28%) were nonprofit nursing homes. Investor-owned homes had a greater percentage of Medicaid-funded residents and more deficiency citations related to government inspections, which routinely evaluate the quality of care in facilities throughout the United States. The number of citations in the investor-owned homes was higher by approximately 6% and higher than both nonprofit and public homes by 46% and 43%, respectively. A similar study was conducted by O'Neill et al. (2003) that evaluated the quality of all free-standing nursing homes in California (approximately 1,100) according to outcome measures for deficiency citations and the relationship to ownership status—profit versus nonprofit, or to use the terminology from the study, proprietary versus nonproprietary. The study also evaluated the seriousness of deficiencies cited. Results showed that, on average, the proprietary homes had 7% more deficiencies than nonproprietary homes.

A study by Zimmerman et al. (2002) evaluated 59 Maryland nursing homes and found that hospitalizations for infections occurred three times more often in for-profit nursing homes than in nonprofit homes. One association found that for each RN lost (based on FTE per 100 beds), the risk for resident hospitalization related to infection

increased more than 80%. Harrington and Swan (2003) found that total nurse and RN staffing was negatively associated with for-profit ownership.

In a systematic review, Hillmer, Wodchis, Anderson, and Rochon (2005) evaluated the association of profit status of U.S. nursing homes and quality of care, using the search engine Medline. The results revealed 81 associations of for-profit homes and quality from 38 studies. Although mixed results were revealed, quality of care in nonprofit nursing homes was found to be at least as good as that in for-profit homes. More specifically, quality of care was worse in for-profit homes. Pressure ulcers, which are considered to be a good indicator of quality outcomes in relationship to staffing levels, were noted to be higher in for-profit homes than in nonprofit homes (Bostick, 2004; Hendrix & Foreman, 2001; Horn et al, 2005). Last, an important result that the authors discussed was that nonprofit nursing homes had a higher skill mix and lower nurse aide turnover rates than did their for-profit competitors.

SUMMARY

This systematic review provided valuable information related to staffing levels, quality, outcomes, turnover rate, case mix, and other issues of importance for the long-term care industry. However, continued research that further defines the association of licensed staff to resident outcomes is needed. Effective solutions that work within budgetary and bureaucratic constraints in the nursing home setting must be considered as viable options, and workforce issues related to a shortage of staff require creative strategies that strengthen recruitment and retention efforts. Licensed staff educated in areas specific to the aging population is needed, and that education must include basics of care to prevent avoidable decline, such as functional loss due to lack of exercise or depression related to inactivity and social isolation.

Poor staff oversight, along with inadequate staffing levels, was also seen as a concern and an area that is lacking in nursing home care (IOM, 2001; Kayser-Jones, 2002; Kayser-Jones et al., 1999; Shipman & Hooten, 2007). This issue is one that reaches significant magnitude in many areas, starting with just providing the basics of resident care—such as the ability to keep a resident clean and toileted to decrease the risk of pressure ulcers—to having enough staff to feed those residents who cannot feed themselves and thereby decrease the risk of malnutrition and to offer and assist with fluid intake and thereby decrease the risk of dehydration. These are the very basics of care that should stir society's emotions and compel its members to fight for legislative change.

In addition, staff turnover rate was identified as a significant problem in long-term care and one that needs to be addressed for all staffing levels, including nurses. An enormous amount of money is spent recruiting and training staff who do not always stay with an organization for a long period of time. Compounding the financial burden is the time that is spent working with staff in an effort to meet the growing needs of the resident population. According to studies conducted by Caudill and Patrick (1991) and Collier and Harrington (2008), the estimated cost of replacing an RN was $7,000 approximately 20 years ago. Costs continue to increase over time, at greater than twice the costs for replacement. Generating creative strategies that address this serious issue is a necessary task for the leadership and managers of long-term care organizations. Finding workable solutions that can be implemented and replicated throughout the country also needs to be considered from an industry standpoint.

In the past, the issue of resident acuity in long-term care has not been considered a priority; however, it is a significant issue that must also be addressed. While research related to acuity has begun, how staffing levels or numbers of staff along with staffing mix—using RNs, LVNs, and contract nurses—affect resident outcomes remains unclear.

Further research that connects the relationship of staffing levels to resident outcomes specific to different types of nurses needs to be undertaken. Additionally, acuity level and the role it plays in relationship to staffing and resident outcomes needs more research. Residents who are in need of skilled nursing services require increased staff time and resource allocation to meet their needs, which may limit staff time spent providing care for residents with fewer physical needs simply because there is an insufficient number of staff to meet all residents' needs. This is a significant issue that warrants both careful consideration in practical terms and much needed research.

This study added to the literature by empirically linking the study variables (RN hours per resident day, RN turnover rate, percentage of RN time that is contract, LVN hours per resident day, LVN turnover rate, and percentage of LVN time that is contract) with resident outcomes (ADL decline, physical restraint use, high-risk pressure ulcers stages 1–4, low-risk pressure ulcers stages 1–4, and weight loss while controlling for facility and resident characteristics). These links have not previously been studied with a large, statewide sample as proposed in this study. When the links are illuminated, remediation plans, if needed, can be created based on empirical data to develop strategies to facilitate improvements in resident outcomes.

Chapter 3: Methodology

The purpose of this chapter is to provide an overview of the study design. First, the research design will be discussed, followed by a description of the study sample. Second, the Resident Assessment Instrument (RAI) and the development of the MDS will be covered, as will the reliability and validity of the MDS and the quality measures (quality indicators), along with the measures' and indicators' history, development, and testing. Next to be discussed are the RUG III Resident Assessment System and the Medicaid Cost Report. Following that will be a discussion of the dependent variables for incidence of ADL decline, use of physical restraints, prevalence of high-risk pressure ulcers stages 1–4, prevalence of low-risk pressure ulcers stages 1–4, and prevalence of weight loss, as well as a description of the independent variables, which are RN hours per resident day, RN turnover rate, percentage of RN time that is contract, LVN hours per resident day, LVN turnover rate, and percentage of LVN time that is contract. Last, the control variables, Case Mix Index (CMI), data analysis, and procedure will be discussed.

RESEARCH DESIGN

The purpose of this cross-sectional descriptive secondary analysis study was to evaluate the association between RN hours per resident day, RN turnover rate, percentage of RN time that is contract, LVN hours per resident day, LVN turnover rate, and percentage of LVN time that is contract and five quality measures that will include incidence of ADL decline, use of physical restraints, prevalence of high-risk pressure ulcers stages 1–4, prevalence of low-risk pressure ulcers stages 1–4, and prevalence of weight loss. Data sources include the MDS, version 2.0, and the Medicaid Cost Report for Texas for a 12-month period—January 1, 2007, through December 31, 2007—for analysis. Data from 2007 was the most current data available for audited Medicaid Cost

Reports. The auditing process takes time to complete; therefore, data was not released for use until the reports were thoroughly checked and deemed free of errors. The quality measures chosen for this study are based on the resident assessment data for the MDS and were obtained from the Centers for Medicare & Medicaid Services (CMS) Quality Indicator Report. The data from this report can be compared with that of other nursing homes in any state in the United States and has been tested for reliability and validity through research.

SAMPLE

This study used a cross-sectional descriptive design that includes data regarding freestanding nursing facilities for 2007 in Texas (N = 618). Preliminary data exploration analysis used a preliminary sample of 635. These analyses included frequency and means for the independent, dependent, and control variables. Additional analyses included correlations between the independent and dependent variables and regression analyses to predict dependent variables from variables with control variables present. The correlation and regression analyses used a final sample of 618 facilities with complete data on all independent, dependent, and control variables.

Data derived from the Texas Medicaid Cost Report for 2007, the Minimum Data Set (MDS), and Quality Indicator (QI) Reports were used for evaluation purposes. Study results are discussed in this chapter, and descriptive data is presented along with pertinent characteristics of facilities, residents, and staff. There were 3 types of analyses: (1) sample description (demographics), (2) simple correlations among predictors, among outcomes, and among control variables, and (3) regression analyses to determine the

relationship between each predictor and outcome controlling for different facility demographics. A power analysis for correlation studies determined a medium R-squared (variance explained) effect size with a statistical power (beta) of 0.80 and a significance level (alpha) of 0.05 (Elashoff, 2002). A sample size of 113 nursing homes was determined to be adequate to detect an R-squared effect size of 0.10 with a power of 0.80, and a sample size of 143 nursing homes was determined to be adequate for a 0.08 effect size with a power of 0.80. After data sets were merged, a final sample of 618 facilities were included (63%) for the year 2007. This number exceeds the power analysis requirements to detect an R-squared effect size of at least 0.08 with more than 0.80 power. This sample size accounts for the exclusion of potential outlier facilities, those with small numbers of residents, and those with unrealistic quality measure scores or unrealistic staffing rates (personal communication, Robert C. Godbout, PhD, April 9, 2008). Criteria for classifying nursing home types include nursing home size—small having 60 beds or fewer, medium having 61 to 120 beds, and large having 121 beds or more. Ownership was categorized as for-profit, nonprofit, or government. Resident age was determined based on MDS assessments, while nursing home size and ownership status data were obtained from the Texas Medicaid Cost Report.

RESIDENT ASSESSMENT INSTRUMENT: THE DEVELOPMENT OF THE MDS

The Resident Assessment Instrument (RAI) is a federally mandated assessment tool developed to collect data about clients in specific health care settings. The RAI consists of the MDS, an assessment tool used in long-term care, and includes more than 500 items describing resident status, services received, and the Resident Assessment

Protocols (RAPs) used to aid in care planning. The RAI was developed to give interdisciplinary teams in long-term care settings a model for structured decision making and problem solving based on a resident's assessment and is the basis for developing the resident's care plan. The interdisciplinary team may include various staff within the organization—for example, a physician, the director of nursing, a social worker, a dietician, a certified nursing assistant, and other individuals who contribute to the resident's care.

The MDS is also used to classify residents for reimbursement, quality improvement through a quality indicator/measures review, care plan development, and service eligibility (Fries & Fahey, 2003). The MDS was developed in 1988 as a draft instrument, originally under the Health Care Finance Administration (HCFA), the federal organization that would later become CMS. The team that developed the MDS established expectations for the future of this instrument, including ongoing staff education with an emphasis on maintaining quality resident care (Morris et al., 1990). A licensed nurse completes the full assessment or a subset of the MDS at intervals after resident admission, continuing throughout the nursing home stay as determined by the admission date and other pertinent information (CMS, 2002).

The MDS provides valuable information about the resident. It covers the resident's background and demographic information and contains questions related to current and past functionality, health status, and services.

RELIABILITY AND VALIDITY OF THE MDS

Morris et al. (1990) completed a small-scale trial of the MDS in two states that included 10 nursing homes—five in North Carolina and five in Massachusetts. The field testing was an opportunity to see how well the nurses who collected the assessment data

understood the use of the instrument and to gauge how long it took to complete the process. Four hundred residents in 10 nursing homes were targeted for assessment using the MDS, with a final sample of 383. Two nurses for each of the 10 nursing homes were chosen for the project. Each had experience in long-term care nursing and in working with the geriatric population, and the nurses completed a day of training on the use of the MDS before the trial started.

The two nurses at each facility completed dual assessments to allow for a reliability determination, filling out the MDS, interviewing the residents they assessed, and requesting information from the staff about the residents they were assessing as needed. The research team, facility staff, and nurses completing the MDS assessments met after the assessments were completed to review the process and obtain valuable information about the usability of the instrument. Face validity was established for the MDS during this trial and during continued evaluation of the instrument over time through responses from clinicians' after they used the MDS during field-testing periods. Nurse inter-rater reliability was tested by the percentage of item agreements, measures of correlation in the nurses' judgments of the same items on the instrument, and the measures of congruence. Convergent validity was established by comparing and measuring concepts similar to that of the MDS to determine how well the concepts were correlated. In the evaluation, it was determined that more than 55% of the MDS items achieved reliability of .4 or greater. Forty percent of the items were kept unchanged after the testing was completed, 40% were revised, and 20% were dropped (Morris et al., 1990). The newly designed MDS went into effect in 1991 across the United States and is the standardized assessment tool in more than 90% of nursing homes today (Hawes et al., 1997).

Hawes et al. (1995) completed further testing of the MDS in 13 nursing homes throughout five states. The results revealed that 89% of MDS items achieved a reliability (intraclass correlation) of .4 or greater, with 63% achieving .6 or greater. Three types of important MDS items that measure functional status—cognition, ADL self-performance, and continence—achieved excellent reliability at .7 or greater. This field testing, compared to the early small-scale trial, showed that MDS items averaged greater than 50% improvement in reliability results (Hawes et al., 1995). A revised version of the MDS (2.0 version) was first used by all Medicare and Medicaid nursing homes throughout the United States as a standardized tool in 1998 (CMS, 2003). Since that time, updates and revisions have continued to improve the validity and reliability of the instrument as well as its usability for long-term care nursing staff. The MDS 2.0 version was the instrument used in all Medicare and Medicaid nursing homes in the United States (CMS, 2008c)

QUALITY MEASURES (QUALITY INDICATORS)

History, Development, and Testing

A valuable feature of the MDS is the ability to collect data about each resident that further translates into quality measures (indicators) and case-mix variables used for reimbursement. Twenty-four quality indicators (QI) are derived from MDS data and are aggregated at the facility, state, and national levels (CMS, 2007). From this compiled data, a QI report is generated for facility staff to use for various purposes such as care plans, education, and policy development. This report requires that facility staff investigate at the resident level to determine whether there is an actual or potential quality concern that needs further investigation (Rantz et al., 1997).

The reliability of the MDS QIs was tested across facilities to determine whether any facility had poor data quality and needed to be excluded from aggregate reports (Abt Associates, 2003). Most important, this information was used to determine how rejecting a facility's data might affect the validity of the QIs. Research nurses used a shorter version of the MDS for reliability testing, and kappa statistical agreement was used to test the reliability between research assessor and the facility assessor.

The Abt research team had few empirical studies to establish a basis for good quality of care and developed constructs or hypotheses that were tested using elements or scales based on the three methods of data collection and the relationship to each QI. The last quality construct developed was labeled as either a "preventative" or a "responsive" strategy. Preventative constructs reflect facility staff actions that are proactive in identifying problems with quality before a concern arises. Preventative strategies adhere to a continuous quality improvement philosophy, whereas responsive strategies discover issues after an event, such as a resident's change of condition. Responsive actions are generally taken after the event has occurred, and quality is improved from the point of discovery. Preventative and responsive strategies were correlated with quality measures through multivariate analysis, and quality measures were classified as "top," "middle," or "not validated." Reliability was tested using 119 pairs of MDS assessments by 26 research nurses. Kappa agreement was high in all MDS items except three, in which it was below .4, the accepted minimum. The average weighted kappa was .78. Inter-rater reliability results demonstrated that facility nurses and research nurses are comparable (Abt Associates, 2003).

In a study conducted by Bates-Jensen et al. (2004), quality indicators for bedfast residents were evaluated for differences in how residents were cared for—more specifically, in practice guidelines. Study results reported significant differences in the

sample (n = 451). This is one example of how data that is obtained from various facilities can be problematic for measurement error. Issues related to processes of care, data collection, and reporting of data must be monitored and evaluated consistently to reduce this risk.

For the current study, the facility level QI percentages of triggered values were obtained by averaging across 12 months, starting with January 1, 2007, through the end of December 31, 2007, using the number of residents who triggered a particular QI on a target MDS assessment divided by the total residents. The yearly values for each QI (dependent outcome variable) were obtained by adding the monthly numerators together for each facility and then adding the monthly denominators together for each facility and dividing the sum of the numerators by the sum of the denominators for each facility. This calculation yielded an average percentage triggered for the entire year for each facility.

RUG III Resident Classification System

The Resource Utilization Group classification system (RUG III) is a case-mix reimbursement system (CMI) that is used in nursing homes throughout the United States to calculate the costs of staff time per day and of resources needed to provide resident care, which are obtained from MDS clinical data (CMS, 2007). Additionally, this classification system accounts and adjusts for preexisting conditions.

The Medicaid Cost Report

The Texas Medicaid Cost Report, required of Medicaid-certified facilities, collects data and reports information related to expenditures for resident care. The data collected covers a period of one fiscal year. Additionally, the cost report provides information about staff hours worked, staffing levels, and staff turnover rate for RNs and LVNs. Data is also collected on hours of care and staffing levels for contract nursing staff

that work in a Texas nursing home. The Texas Health and Human Services Commission is the government agency that publishes the cost report results and that determines and approves payment rates for the Medicaid program related to the reimbursement of resident care. The cost report is gaining acceptance in research for staffing data because of its higher degree of accuracy compared to the data from the annual health and quality survey system (OSCAR system; Kash, Hawes, & Phillips, 2007). The reliability of OSCAR data has been questioned in previous studies (Bostick et al., 2006; Castle & Myers, 2006; Dellefield, 2000, 2006b; Kash, Hawes, & Phillips, 2007; Zhang et al., 2006).

In a study published by Kash, Hawes, and Phillips (2007), the researchers evaluated and compared the validity of the OSCAR data to that of the Medicaid Cost Report. One concern identified with the OSCAR data is that some nursing homes "staff up" before the annual survey, specifically scheduling more direct care staff than usual. The problem with nursing homes' staffing up before a survey is lessened with the cost report because the data is collected at the end of a calendar or fiscal year instead of during the annual survey, which specifically checks for required staffing levels.

DEPENDENT VARIABLES

Quality Measures

For this study, five quality measures—incidence of ADL decline, use of physical restraints, prevalence of high-risk pressure ulcers stages 1–4, prevalence of low-risk pressure ulcers stages 1–4, and prevalence of weight loss—were selected from the Centers for Medicare & Medicaid Services (CMS) Quality Indicator report and are the dependent-outcome variables measured.

ADL decline: ADL decline is measured by the amount of involvement that a resident has in ADL performance, including the amount and type of assistance that the staff provides during a 7-day period. This is more specifically measured as the percentage of residents who meet the definition of late-loss ADL. The Quality Indicator description is as follows:

Percent of residents whose need for help with daily activities has increased

Numerator: Percent of residents with worsening (increasing MDS item score) in Late-Loss ADL self performance at target relative to prior assessment. Residents meet the definition of Late-Loss ADL worsening when at least two of the following are true: Bed mobility – Level at target assessment – Level at previous assessment is greater than 0, or Transfer - Level at target assessment – Level at previous assessment is greater 0, or Eating - Level at target assessment – Level at previous assessment is greater than 0, or Toileting - Level at target assessment – Level at previous assessment is greater than 0,

OR at least one of the following is true:

Bed mobility – Level at target assessment – Level at previous assessment is greater than 1, or Transfer - Level at target assessment – Level at previous assessment is greater than 1, or Eating - Level at target assessment – Level at previous assessment is greater than 1, or Toileting -Level at target assessment – Level at previous assessment is greater than 1.

Denominator: All residents with a valid target and a valid prior assessment.

Abt Associates Inc. November 2004 (v1.2) 2-4. ***Exclusions*:** Residents meeting any of the following conditions: 1. None of the four Late-Loss ADLs bed mobility, transfer, eating, or toileting, and each of the four have a value of 4 (total dependence) or a value of

8 (activity did not occur) on the prior assessment. 2. The QM did not trigger (resident not included in the numerator) AND there is missing data on any one of the four Late-Loss ADLs on the target assessment or prior assessment. 3. The resident is comatose or comatose status is unknown or missing on the target assessment. 4. The resident has end-stage disease or end-stage disease status is unknown or missing on the target assessment. 5. The resident is receiving hospice care or hospice status is unknown or missing on the target assessment or the most recent full assessment (Abt Associates Inc., November 2004). See Appendix 1: Minimum Data Set Tool for specific coding requirements.

Physical restraint: "Any manual method or physical or mechanical device, material, or equipment attached or adjacent to the resident's body that the individual cannot remove easily which restricts freedom of movement or normal access to one's body" (CMS, 2009, p. 3-198). The daily use of a physical restraint was documented as residents who were physically restrained on the target assessment. Restraints included in this description are trunk restraints, limb restraints, and chair prevents rising. The term *chair prevents rising* includes anything that restricts a resident's ability to rise from a sitting position due to any type of restrictive device or a chair that restricts such movement (Abt Associates, 2003; CMS, 2007).

The Quality Indicator definition is as follows:

Percent of residents who were physically restrained: ***Numerator:*** Percent of residents who were physically restrained daily as coded on the target assessment. ***Denominator*****:** All residents with a valid target assessment. ***Exclusions:*** Residents satisfying the following conditions: 1. The target assessment is an admission assessment; 2. The QM

did not trigger (resident is not included in the QM numerator) *and* the value for "Devices and Restraints" is missing on the target assessment or has not been coded on the MDS assessment (Abt Associates, 2004). See Appendix 1: Minimum Data Set Tool for specific coding requirements.

Pressure sores (high risk): The Quality Indicator definition is as follows:

Pressure sores—Paired measures: Percent of high-risk residents who have pressure sores. ***Numerator:*** Percent of residents with pressure sores (Stage 1–4) on the target assessment. ***Denominator*:** All residents with a valid target assessment and any one of the following inclusion criteria: 1. Impaired in bed mobility or transfer on the target assessment as indicated by the need for extensive assistance, total dependence, or the activity did not occur, 2. comatose on the target assessment, or 3. suffered malnutrition on the target assessment.

Pressure sores (Low risk): Percent of low-risk residents who have pressure sores: ***Numerator:*** Percent of residents with pressure sores (Stage 1–4) on the target assessment. ***Denominator*:** All residents with a valid target assessment and not qualifying as high risk. ***Exclusions for both measures:*** Residents satisfying any of the following conditions are excluded from all risk groups (high and low): 1. The target assessment is an admission assessment; 2. The QM did not trigger (resident is not included in the QM numerator) *and* the value of "pressure ulcer" is missing or has not been coded on the target assessment; 3. The resident does not qualify as high-risk *and* the value Physical Functioning and Structural Problems for the resident's self performance of bed mobility or transfer is missing or has not been coded on the target assessment; 4. The resident does

not qualify as high-risk *and* the value for "comatose" which would be an exclusion is missing on the target assessment. (For the purpose of the Quality Indicator definition, the term *pressure sore* is used instead of *pressure ulcer* as noted on the MDS. (Abt Associates, 2004). See Appendix 1: Minimum Data Set Tool for specific coding requirements.

Weight loss: Unplanned weight loss can have negative consequences on the elderly and is evaluated at intervals during a resident's nursing facility stay. The prevalence of weight loss is measured as a loss of 5% in 30 days or 10% in 6 months. For the purpose of this study, weight loss describes "unintended weight loss" only.

The Quality Indicator definition is as follows:

Percentage of residents who lose too much weight: ***Numerator:*** Percentage of residents who have experienced weight loss of 5 percent of more in the last 30 days or 10 percent or more in the last 6 months (Abt Associates, 2003; CMS, 2008c). ***Denominator:*** All residents with a valid target assessment. ***Exclusions:*** Residents satisfying any of the following conditions: 1. The target assessment is an admission assessment; or this information is missing on the target assessment; 3. The resident is receiving hospice care or hospice status is unknown if this information is missing or has not been coded on the MDS assessment (Abt Associates, 2004). See Appendix 1: Minimum Data Set Tool for specific coding requirements. Quality measures for this study were chosen based on research that identified their sensitivity to nurse staffing levels (Bostick, 2004; Bostick et al., 2006; Rantz et al., 2004).

INDEPENDENT VARIABLES

Nurse Staffing and Turnover Rate

The variable "nurse staffing ratios" includes hours of care per resident day (hprd), collected from the 2007 Medicaid Cost Report, and is reported separately for staff RNs, staff LVNs, contract RNs, and contract LVNs. A calculation for turnover rate was measured separately for staff RNs and staff LVNs. For this study, the staffing ratio, or hprd, was calculated as productive hours of full-time, part-time, and contract nursing staff for RN and LVN. Contract RN and LVN were calculated as a proportion of hours worked. Hours worked were divided by the total annual resident days of care. Staff mealtime, vacation hours, sick time, disability, and other paid time off were excluded. Turnover rate was calculated according to the Texas Medicaid Cost Report instructions as the number of staff unemployed at year's end divided by the number of employees (full-time-equivalents [FTEs]) employed during the year.

CONTROL VARIABLES

Facility, Market, and Resident Characteristics

Facility size, ownership, geographic location (rural vs. urban), resident acuity (case mix), and average resident age in the facility are variables that have the potential to confound the results of the analysis. These facility characteristics served as control variables in multiple regression models used to determine the relationships between the independent variables (staffing variables) and the dependent variables (QIs). Facility size was categorized by the number of beds in a facility as follows: fewer than 61 beds (small

facility), 61 to 120 beds (medium facility), and more than 120 beds (large facility). Ownership includes for-profit, nonprofit, and government nursing homes in Texas serving Medicaid, Medicare, and private-pay residents. The resident age variable for this study was calculated as a percentage of residents aged 65 years and older in the facility. Residents of this age generally continue to present increases in chronicities and complexity of care needs. As life span increases, it is assumed that older adults become more likely to trigger the quality indicators chosen for this research.

Case Mix Index (CMI)

The CMI, calculated for each 34-group RUG III group, is a measurement that was developed for CMS to estimate relative resource use according to a resident's various care needs (Fries et al., 1994). The CMI for each RUG III group is derived from the CMS nursing home time study of 1995–1997 (Burke & Cornelius, 1998). The CMI accounts for both functional assistance and nursing care (nurse aide and licensed nursing staff) and has a range from 0.59 to 2.10, lowest to highest. A special licensed nursing CMI was created for this study that measures only RNs and LVNs.

The licensed nursing CMI for each group was calculated as the average per diem number of RN minutes for the group (weighted by the average RN wage in Texas) plus the average per diem number of LVN minutes for the group (weighted by the average LVN wage in Texas). This calculation represents the average cost of licensed nurse care for RNs and LVNs for each RUG III group. The CMIs were standardized to relative values so that the average value is 1.0 for the Texas nursing home resident population. A licensed nursing CMI based on the 34-group RUG III classification was assigned to each MDS assessment using a SAS program. For residents identified in the facility on a

selected "snapshot" target date, the CMI from the most recent assessment, on or before that date, was chosen. For this study, Case Mix Index (CMI) was calculated using MDS data for four 2007 target dates: the last day of March 2007 (first quarter), the last day of June 2007 (second quarter), the last day of September 2007 (third quarter), and the last day of December 2007 (fourth quarter). Residents discharged before a target date who did not return to the facility were excluded. After the CMI was calculated for each facility for each quarter, the four quarters were averaged to yield an overall facility average.

PROCEDURE

The University of Texas at Austin Institutional Review Board approved the study proposal (approval code 2009-03-0066). A secondary analysis of data from the MDS 2.0, the Quality Indicator Reports, and the Medicaid Cost Report for Texas was completed. Although information about human subjects was involved in this study, only data compiled at the aggregate facility level and de-identified resident level was used to ensure that privacy was maintained throughout the process. Facility names were not used, and de-identified alphanumeric codes were assigned and used where facility identifiers were necessary. Informed consent was not necessary for the facility or de-identified resident data.

Individually identifiable or deducible data was not transmitted by unsecured telecommunications, which include the Internet, e-mail, and electronic file transfer protocol (FTP). Further, the data was not physically moved or transmitted in any way from the University of Texas at Austin without written approval from CMS. When this study is completed, all original data received from CMS will be destroyed and a Certification of Destruction will be sent to CMS identifying the date of destruction of data received. Residents' identifiable information was treated in a confidential manner

and was not transferred electronically via e-mail or other protocols. Shredders were used to destroy printed material containing individual identifiers as applicable.

MDS AND QUALITY INDICATOR/QUALITY MEASURES DATA

ResDAC, located at the University of Minnesota, provided assistance to guide this research process. ResDAC staff act in the role of liaison requesting the use of CMS data for individuals who conduct research through a university or government agency. A ResDAC Data Request Document Checklist was completed along with a formal request for the use of MDS data according to the ResDAC criteria. (See appendices for associated paperwork.) The ResDAC staff facilitated the request for data after the preliminary process was completed. Specific data files request included one year of Texas resident MDS data for the CMI (RUG) calculation with target dates in 2007. Additional requests included one year of Texas facility-level quality indicator/measure data for nursing homes for the 2007 reporting period.

A DVD containing MDS data was received from CMS as researcher identifiable (RIF) data because it contains person-specific identifiers. The MDS files do not contain social security numbers or health insurance claim (HIC) numbers, instead containing the CMS's internal unique resident identifiers. Individually identifiable or deducible data was not transmitted by unsecured telecommunications, including the Internet, e-mail, and electronic FTP. The data received on DVD was copied to a secure server (disk.austin.utexas.edu) at the University of Texas Information Systems Technology facility, and access was password protected at the individual user level. Further, the data has not been physically moved or transmitted in any way from disk.austin.utexas.edu without written approval from CMS. The original DVD data received from CMS was stored in a locked file cabinet at 1700 Red River, The University of Texas at Austin

School of Nursing, Austin, TX 78701-1499 (Alan McKendree, System Analyst, U.T. School of Nursing, personal communication, June 3rd, 2009).

The server on which the DVD data was stored meets the minimum standards set by UT's Information Security Office and UT System directive UTS165 (http://www.utsystem.edu/policy/policies/uts165.html) for storing Category I (most sensitive) data. IPSec, WebDAV, or SFTP must be used to connect, and full daily backups of files are made to redundant disks. Reliability of disk.austin.utexas.edu is enhanced through clustered server hardware, storage area network (SAN) architecture, backups to both disk and tape, and volume shadowing. Anti-virus software is installed and kept current, and security patches released by Microsoft are promptly installed. No data is stored on the researcher's local workstations. Access to the data stored on disk.austin.utexas.edu was gained only by using individually issued UT electronic IDs, with a strong password known only to that individual, and by individual UTEIDs that were granted access to the data for research and/or administrative purposes. Firewalls are present at either end of the client/server communication chain, making unlawful penetration only an insignificant security concern. Staff allowed access to protected information as defined by the Health Insurance Portability and Accountability Act (HIPAA) received a briefing prior to starting the research process (Alan McKendree, System Analyst, U.T. School of Nursing, personal communication, June 3rd, 2009).

TEXAS MEDICAID COST REPORT DATA

The Texas Medicaid Cost Report was the second database chosen for this study. A request was made to the manager of cost reporting and support services at the Texas Health and Human Services Commission (HHSC) for access to Medicaid Cost Report data for the period of January 1, 2007, through December 31, 2007. The cost report was

used to provide facility staffing data related to numbers and hours of staff for each shift as well as staff turnover rate for different staff types—staff RNs, staff LVNs, contract RNs, and contract LVNs—who work in Medicaid-contracted nursing homes. Specifically included were hours worked, wages earned, and staff turnover rate. These data were supplied in an Excel spreadsheet and transmitted electronically.

DATA ANALYSIS

A multiple linear regression technique was used to analyze outcomes for each quality measure to determine the strength of relationship between facility-licensed nurse staffing and turnover rate and the quality measures. This analysis technique was chosen for this study because it allows the researcher to test predictor (independent) variables to determine if there is an association or a relationship between the independent and dependent outcome variables while controlling for other variables that may be related to the dependent outcome variables. Excel and SAS statistical programs and software were used for data analysis for this study. Four underlying assumptions of multiple regression were met.

The following table is an example of the regression equation used in this study for each QI; the one in the example is for high-risk pressure ulcer. The same approach was used for each QI. The main result of interest for each equation was the parameter (beta coefficient value) and the significance level (p-value) for each independent variable (staffing variable) in the equation, which was set at ($p < .05$). See Table 3.1.

Table 3.1. High Risk Pressure Ulcer Example

Dependent	Model F (df1, df2)	Model *p*-value	Adjusted R^2	Independents	Parameter estimate	*p*-value*
High- risk pressure ulcer	6.76 (12, 605)	<.0001	.1007	Intercept	0.26822	0 .0053
				RN hprd	0.04323	0.0787
				LVN hprd	0.03779	0.0026
				RN turnover	0.00260	0.8144
				LVN turnover	0.01819	0.2025
				RN contract hprd	0.02816	0.6293
				LVN contract hprd	–0.09084	0.2884
				Facility size	0.00171	0.6879
				Average CMI	0.09919	<.0001
				Urban/rural	–0.00216	0.6696
				Profit/nonprofit	–0.01002	0.1836
				Government	–0.00505	0.7241
				Average age	–0.00373	0.0009

*Significant at .05 level.

Control variables used for this study included facility size, case mix, rural or urban location, facility ownership (for-profit, nonprofit, and government), and resident age (percentage of residents 65 years of age or older).

DATA CLEANING

Data cleaning is a process used to check for errors prior to starting data analysis. By checking for errors in the data early in the process, problems are corrected and flagged so that if similar issues are repeated, they can also be corrected (Chapman, 2005). Standard issues related to data cleaning and preparation were dealt with according to recommendations by prior researchers using large data sets such as the MDS and the Medicaid Cost Report (Harrington et al., 2005; CMS, 2001; Kash, Hawes, & Phillips, 2007). Data management for this study was extremely critical due to the use of secondary data sources. Data error can occur at any point in the data analysis; therefore, a systematic process was necessary to reduce this risk to every extent possible. Chapman (2005) found that the use of notes or a system for flagging identified concerns reduced the risk of a similar occurrence for problematic issues found in working with the data. The data used in this study has been dealt with similarly and addressed at each point in time.

MISSING DATA

The cost report data set initially contained 1,015 nursing facilities, and the CMS MDS and QI data initially contained 1,074 nursing facilities. After the merging of the cost report file and the MDS and QI files, missing data was omitted as identified in the Medicaid Cost Report, Minimum Data Set 2.0 (MDS), and Quality Indicator Report. If data were missing from the five QIs and could not be averaged for analysis, those data were omitted. Some QIs contained more complete reported data than others, affecting the number of observations available for testing. A total of 439 facilities (43%) were excluded due to missing data from the CMS MDS or QI data. Of this number, 270 (26.6%) were missing facility identification needed to match the MDS Medicare data with the cost report data. Another 105 facilities (9.67%) were missing outcome data, and

59 facilities (5.8%) were missing predictor values. Of the total number of Medicare cases, 5 (0.5%) were missing the CMI value. The preliminary data exploration analyses used a sample of 635 facilities. These analyses included frequency and means for the independent, dependent, and control variables. The correlation and regression analyses used a final sample of 618 facilities with complete data on all independent, dependent, and control variables.

There are a number of explanations for missing data; some of the more common ones follow. Residents' personal identifiers are sometimes entered into the CMS database incorrectly, or a discharge assessment is not completed and submitted into the CMS database. Data can also be missing due to a change in facility ownership because a cost report is split in a reporting period and data may not be reported or submitted in a small facility. Last, if a facility has nothing to report throughout the year then the report is considered to be "missing," Department of Aging and Disability Services, (DADs) (2011). For this study, if there were missing QI data for any of the four quarters in 2007, an average was obtained based on the available data (quarters) to reduce the amount of data excluded. The final MDS data set included approximately 90,000 resident cases in addition to the QI files used for outcome measures. The final data set included approximately 75% of the original CMS resident files.

PROTECTION OF HUMAN SUBJECTS

Human subjects were not part of this study; however, information about human subjects is addressed to the extent necessary. Only data compiled at the aggregate facility level and de-identified resident level was used to ensure that privacy was maintained throughout the process. Information used about residents living in a nursing home was de-identified, and alphanumeric codes were assigned and used where facility identifiers

were necessary. Informed consent was not necessary for the facility or de-identified resident data that was randomly selected. All data was maintained in a secure office and locked in a file cabinet with limited, specified access. Staff allowed access to protected information as defined by HIPAA received a briefing prior to starting the research process.

Chapter 4: Study Results

This study used a cross-sectional descriptive design that included data regarding freestanding nursing facilities for 2007 in Texas (N = 618). Preliminary data exploration analysis used a preliminary sample of 635. These analyses included frequency and means for the independent, dependent, and control variables. Additional analyses included correlations between the independent and dependent variables and regression analyses to predict dependent variables from variables with control variables present. The correlation and regression analyses used a final sample of 618 facilities with complete data on all independent, dependent, and control variables.

Data derived from the Texas Medicaid Cost Report for 2007, the Minimum Data Set (MDS), and Quality Indicator (QI) Reports were used for evaluation purposes. Study results are discussed in this chapter, and descriptive data are presented along with pertinent characteristics of facilities, residents, and staff. There were 3 types of analyses: (1) sample description (demographics), (2) simple correlations among predictors, among outcomes, and among control variables, and (3) regression analyses to determine the relationship between each predictor and outcome controlling for different facility demographics. A description of the sample used for this secondary analysis is presented in detail in Table 4.1.

The analysis yielded answers for the five research questions regarding staffing levels for RN hours per resident day (hprd), RN contract hours per resident day, (hprd),

RN turnover rate, LVN hours per resident day (hprd), LVN contract hours per resident day (hprd), and LVN turnover rate. The independent predictor variables were evaluated to determine what relationship, if any exists with five resident outcomes: ADL decline, high-risk pressure ulcers, low-risk pressure ulcers, physical restraints, and weight loss. Control variables include facility size, case mix, geographic location (rural vs. urban), ownership, and resident age. Tables and figures are included throughout this chapter to capture the results for each research variable. The Pearson correlation coefficient was analyzed to determine the relationships between predictor (staffing) variables. This process was an important step and part of the diagnostics testing conducted prior to running the regression models. Assumptions were met for multiple regression, and regression models were run for each of the five dependent variables to determine which predictors, if any contributed to the significance of each model.

POPULATION

Data derived from the Texas Medicaid Cost Report for 2007, the Minimum Data Set (MDS), and Quality Indicator (QI) Reports were used for evaluation purposes. From these data sources data sets were merged resulting in 635 nursing facilities included in the analysis of nursing facilities (63%) in Texas for the year 2007. This number exceeded the power analysis requirements to detect an R-squared effect size of at least 0.08 with more than 0.80 power. This sample size accounts for the exclusion of potential outlier facilities, those with small numbers of residents, and those with unrealistic quality measure scores less than 30 residents in any of the QI/QMs or unrealistic staffing rates

(personal communication, Robert C. Godbout, PhD, April 9, 2008). An example of an unrealistic staffing rate would be a nursing facility with higher resident acuity such as a Medicare skilled nursing unit that requires higher staffing of RNs to accommodate acuity needs. This would include those that are above the average of what is normally seen for staffing levels in other nursing homes.

A power analysis for correlation studies, determined a medium R-squared (variance explained) effect size with a statistical power (beta) of 0.80 and a significance level (alpha) of 0.05 (Elashoff, 2002). A sample size of 113 nursing facilities was determined to be adequate to detect an R-squared effect size of 0.10 with a power of 0.80, and a sample size of 143 nursing facilities was determined to be adequate for a 0.08 effect size with a power of 0.80.

For this study, nonprofit, for-profit, and government nursing facilities were evaluated. Of these, nonprofit accounted for 88 (13.86%) of the nursing facilities in Texas, 526 (82.83%) were for-profit, and 21 (3.31%) were government facilities. The numbers of such nursing facilities nationwide in 2007 were higher for nonprofit facilities, at 27%, lower for for-profit facilities at 66%, and higher for government facilities, at 7%. For the purpose of this research, facility size (number of beds) was treated as a categorical variable with fewer than 60 beds categorized as small, 61 to 120 beds being medium, and more than 120 beds being large. Of nursing facilities included in the study, 93 (14.65%) nursing facilities had fewer than 60 beds, 383 (60.31%) had 61 to 120 beds, and 159 (25.04%) had more than 120 beds. Of the facilities in the study sample, approximately 85% were in the medium or large ranges, and less than 15% were in the

small range. The average number of beds in of all nursing facilities nationwide for 2007 was 107 beds, which is greater than 60% of nursing facilities in Texas for that year (AHCA, 2007). For this study, facility size was calculated for each regression model as the number of beds in each facility.

For geographic location, 344 (54.17%) nursing facilities were located in urban areas, and 291 (45.83%) were located in rural areas. For this study, the age range for nursing facility residents was 65 years and older, with an average resident age of 82.5 years, falling slightly below the national average of 83.2 years (US Census Bureau, 2007). The Resource Utilization Group (RUG III) was used with the MDS 2.0 as a measure of acuity and resource utilization time. The case mix index (CMI) across all facilities was 1.10, with a range of 0.78 to 1.54. This measure is calculated at the time of admission and is determined by an estimate of the amount of staff resources and time spent providing care based on each resident's acuity. The national average for CMI in 2007 was slightly higher, at 1.15. Since 2000, the trend has continued to reflect an increase in resident acuity for those who have greater nursing needs at the time of admission and consequently require higher levels of skilled service and resource utilization (Partha, 2010).

Table 4.1: Demographic Statistics of Nursing Facilities (N= 635)

Description	Frequency	Percentage
Facility Size		
Small: < 60 beds	93	14.65
Medium: 61–120 beds	383	60.31
Large: > 120 beds	159	25.04
Ownership		
For-Profit	526	82.83
Nonprofit	88	13.86
Government	21	3.31
Geographic Location		
Rural	291	45.83
Urban	344	54.17
Resident Characteristics		M(SD)[1]
Age		82.5(2.33)
CMI[2]		1.11(0.130)

[1]M(SD): Mean and standard deviation; [2]CMI: Case mix index

STAFFING DATA

Staffing data were calculated in hours per resident day (hprd) and was used as a standard measure in nursing facilities throughout the United States. As noted in this study, Texas staffing-specific requirements in a nursing facility call for a Director of Nursing who is a registered nurse (RN) to be on duty 40 hours per week. An RN must be on duty for 8 consecutive hours, 7 days a week. A licensed nurse, who can be an RN or LVN, must be on duty 0.4 hprd for 1.20 hours over a 24-hour period, (Harrington, 2008). In this study, the mean hprd for RNs and LVNs were 0.23 and 0.90, respectively. This

breaks down to approximately 13 minutes for an RN in 24 hours, or 4.33 minutes per 8-hour shift, and 54 minutes for an LVN in 24 hours, or 18 minutes per 8-hour shift. This is the equivalent of approximately 4.5 minutes of care provided by an RN for each 8 hour shift and varies depending on the number of residents and the number of staff on duty. The RN hprd average for Texas is lower than the national average, while the LVN hprd average is higher. In 2007, the national average of RN hprd was 0.6, or 36 minutes in 24 hours, and the national average of LVN hprd was 0.8, or 48 minutes in 24 hours. The national average for RN hprd reflects a 14% decrease in RN time since 2001, which may be partly due to the implementation of the Medicare prospective payment system and a decrease in Medicare reimbursement since the late 1990s (Harrington, Carillo, & Blank, 2008).

In the study by Harrington et al. (2008), a higher percentage of LVN hprd was noted for 2007, which supports the findings for this research, showing more LVN hprd and less RN hprd. For this study, the use of contract nurses was low overall, with a mean of 0.01 hprd for RNs and a mean of 0.009 hprd for LVNs. In a survey conducted by the Texas Center for Nursing Workforce Studies in 2008, 41% of Texas nursing facility administrators and directors of nursing responded to questions regarding staffing practices in their facility. One of the survey questions was about the use of contract nursing staff over the 7 days prior to completing the survey. Of the responders, 11% reported using contract staff to fill LVN direct care staff positions. For this study, the RN turnover rate in 2007 was 42%, while the LVN turnover rate was 44%. The national average for RN turnover rate in 2007 for nursing homes was slightly lower, at 41%, and

the LVN turnover rate was higher, at 50%. The Texas and national averages are within a range of 10% for both RNs and LVNs for nursing homes (Texas Center for Nursing Workforce Studies, 2008).

For this study, five quality measures—incidence of ADL decline, use of physical restraints, prevalence of high-risk pressure ulcers stages 1–4, prevalence of low-risk pressure ulcers stages 1–4, and prevalence of weight loss—were selected from the Centers for Medicare & Medicaid Services (CMS) Quality Indicator report and were the dependent-outcome variables evaluated at the facility level. The highest prevalence for a quality indicator was ADL decline at 14% for Texas nursing facilities ($M = 0.14$, $SD = 0.07$) compared to the national average for 2007 which was slightly higher at 17%. High-risk pressure ulcer was 12% for Texas nursing facilities ($M = 0.12$, $SD = 0.06$) compared to a slightly higher national average of 14% for 2007. Low risk pressure ulcer was 2% for Texas nursing facilities ($M = 0.02$, $SD = 0.02$) compared to the national average of 3% for 2007. Physical restraints was 5% for Texas nursing facilities ($M = 0.05$, $SD = 0.06$) compared to 5% for the national average for 2007. Finally, weight loss was 8% for Texas nursing facilities ($M = 0.08$, $SD = 0.04$) compared to a national average of 10% for 2007. All quality measures were better or the same as national averages.

For this study, preliminary data exploration analysis used a sample of 635 nursing homes. These analyses included frequency and means for the independent, dependent, and control variables. Additional analyses included correlations between the independent and dependent variables and regression analyses to predict dependent variables from variables with control variables present. The correlation and regression analyses used a

final sample of 618 facilities with complete data on all independent, dependent, and control variables therefore a sample range of 627-635 nursing homes is noted. See Table 4.2

Table 4.2: Independent Variable Outcomes

Staff Type	N	Mean	Std. Dev.	Median	Min.	Max.
RN-hprd	635	0.23	0.11	0.20	0.05	0.71
RN-contract hprd	635	0.01	0.04	0.00	0.00	0.36
RN-turnover rate	625	0.42	0.26	0.44	0.00	0.96
LVN-hprd	635	0.90	0.20	0.90	0.35	1.73
LVN-contract hprd	635	0.009	0.03	0.00	0.00	0.47
LVN-turnover rate	627	0.44	0.20	0.46	0.00	0.92
Dependent Variable Outcomes						
Outcome	N	Mean	Std. Dev.	Median	Min.	Max.
ADL decline	634	0.14	0.07	0.14	0.01	0.44
High- risk pressure ulcer	634	0.12	0.06	0.12	0.00	0.37
Low-risk pressure ulcer	634	0.02	0.02	0.01	0.00	0.15
Physical restraints	634	0.05	0.06	0.03	0.00	0.32
Weight loss	634	0.08	0.04	0.07	0.00	0.28

RN = Registered nurse; LVN = Licensed vocational nurse; hprd = Hours per resident day; ADL = Activities of daily living

Pearson Correlations, Independent Variables, and Multicollinearity

Pearson correlations were used to test for bivariate relationships between the independent variables to assess possible multicollinearity in the regression models. Generally, for research evaluating multiple regression models, correlated bivariate

relationships with an *r*-value of 0.89 or higher warrant further diagnostic testing (O'Rourke, Hatcher, & Stepanski, 2005). For this study, multicollinearity was not a concern due to the absence of highly correlated independent variables, therefore reducing the risk of redundancy in the regression models. The correlation matrices are discussed for independent (staffing) variables, control variables, and dependent (outcome) variables. Further testing of relationships between variables in this research was evaluated in the multiple regression models and is not reflected in separate bivariate models.

Correlation Matrix—Independent Variables (Staffing Characteristics)

A Pearson correlation matrix was used to evaluate the bivariate relationships between staffing characteristics (independent variables). This included RN hprd, contract RN hprd, RN turnover rate, LVN hprd, contract LVN hprd, and LVN turnover rate. As seen in Table 3, staffing variables were weak to moderately correlated with *r*-values ranging from $\pm$ 0.097 to 0.54 and with *p* values ($p < .05$) indicating significance for 7 of the 15 correlations. Significant correlations occurred because of the large sample size. RN hprd was significantly and weakly correlated with all staffing variables ($r = \pm 0.097$ to ± 0.24, $p < .05$). Contract RN hprd was significantly and weakly correlated with contract LVN hprd ($r = 0.303$, $p < .05$). RN turnover rate was significant and moderately correlated with LVN turnover rate ($r = 0.540$, $p < .05$). See Table 4.3.

Table 4.3: Staffing Variable Correlations

	RN hprd	RN contract hprd	RN turnover rate	LVN hprd	LVN contract hprd	LVN turnover rate
RN hprd	1.00	0.162 <0.0001	–0.122 0.002	–0.240 <0.0001	0.097 0.015	–0.106 0.008
RN contract hprd		1.00	0.027 0.501	–0.056 0.156	0.303 <0.0001	0.047 0.241
RN turnover rate			1.00	0.064 0.108	0.031 0.442	0.540 <0.0001
LVN hprd				1.00	0.075 0.058	0.033 0.404
LVN contract hprd					1.00	0.072 0.074
LVN turnover rate						1.00

Pearson correlation coefficients N = 618; $p < 0.05$ Cells-Upper: Correlation, Lower: Significance

CORRELATION MATRIX—QUALITY MEASURES (DEPENDENT VARIABLES)

The five quality measures (dependent variables) in this study—ADL decline, high-risk pressure ulcers, low-risk pressure ulcers, physical restraints, and weight loss—were evaluated in a Pearson correlation matrix. As seen in Table 4.4, the dependent variables were significant and weakly correlated with *r*-values ranging from $\pm$ 0.083 to $\pm$0.220 and significance ($p < .05$) for 4 of the 10 correlations. ADL decline was significant and weakly correlated with weight loss, ($r = 0.210$, $p < .0001$). High-risk pressure ulcer was significant and weakly correlated with low-risk pressure ulcer, physical restraint, and weight loss with *r*-values ranging from $\pm$0.083 to 0.220, $p < .05$.

Low-risk pressure ulcer was significant and weakly correlated with weight loss at (r = 0.112, $p < .05$). See Table 4.4.

Table 4.4: Dependent Variable Correlations

	ADL decline	High-risk pressure ulcer	Low-risk pressure ulcer	Physical restraint	Weight loss
ADL decline	1.00	0.073 0.070	–0.062 0.120	–0.019 0.640	0.210 <0.0001
High-risk pressure ulcer		1.00	0.180 <0.0001	0.083 0.040	0.220 <0.0001
Low-risk pressure ulcer			1.00	0.040 0.360	0.112 0.005
Physical restraints				1.00	0.074 0.062
Weight loss					1.00

Pearson correlation coefficients $N = 634$, $p < 0.05$ Cells
Upper: Correlation, Lower: Significance

RESIDENT-FACILITY CHARACTERISTICS: CONTROL VARIABLES

The range for correlated control variables was $\pm$0.122 to $\pm$0.329. Facility size was significant and correlated with CMI, urban location, government, and age (r's = $\pm$ 0.187 to 0.329, < .0001). CMI was significant and correlated with all other control variables except for nonprofit

(r's = $\pm$0.142, $p < .0001$ to 0.250, $p < .0001$). Urban location was significant and weakly correlated with nonprofit, government, and age (r's= $\pm$0.122 to 0.206). Nonprofit was significant and weakly correlated with age at (r = 0.252, $p < 0.0001$). For-profit was significant and correlated age at (r's = –0.293, $p < 0.0001$). Control variable correlations

that reflect "n/a" were not included because they involve mutually exclusive categories of ownership. Government was correlated with age ($r = 0.130$, $p < 0.001$). See Table 4.5.

Table 4.5: Control Variable Correlations

	Facility size	CMI	Urban	Non-profit	For-profit	Gov't	Age
Facility size	1.00	0.329 <.0001	0.220 <.0001	0.014 0.732	0.076 0.055	–0.187 <.0001	–0.200 <.0001
CMI		1.00	0.250 <.0001	–0.040 0.320	0.142 .0003	-0.223 <.0001	–0.152 <.0001
Urban			1.00	0.122 0.002	-.033 0.405	–0.166 <.0001	-0.206 <.0001
Non-profit				1.00	"n/a"	"n/a"	0.252 <.0001
For-profit					1.00	"n/a"	–0.293 <.0001
Gov't						1.00	0.130 <0.001
Age							1.00

Pearson correlation coefficients N = 618; $p < 0.05$ Cells-Upper: Correlation, Lower: Significance

Multiple Regression Models

Multiple regression models were run at the completion of the Pearson Correlation Coefficient analyses. The models for this study serve the purpose of answering a series of research questions posed for this study. Each dependent (outcome) variable was evaluated in a model with six independent (predictor) variables: RN hprd, RN contract

time, RN turnover rate, LVN hprd, LVN contract time, and LVN turnover rate. β is the regression coefficient for the predictors in each model. Control variables—facility size (number of beds), ownership (for-profit, nonprofit, and government), location (urban and rural), CMI, and resident age—were included to evaluate the prediction of each outcome based on the staffing variables with the control variables held constant. As previously discussed in Chapter 3, missing data were an issue that required a series of measures be taken, before the regression models could be run and analyzed. Regression analysis could only include facilities with complete data for that analysis. Since an outcome QM value is missing when there are fewer than 30 residents included in the QM, the different regression models have slightly different numbers of observations. A summary of the regression models analyzed for this study is reported in Tables 4.6-4.10.

Question One

What is the relationship between RN hours per resident day, RN turnover rate, percentage of RN time that is contract, LVN hours per resident day, LVN turnover rate, percentage of LVN time that is contract and the prevalence of high-risk pressure ulcers stages 1–4, adjusting for facility size, case mix, geographic location (rural vs. urban), ownership, and resident age?

The regression model was significant (F (12,605) = 6.76, $p < 0.0001$) with an unadjusted R^2 of 12% and an adjusted R^2 of 10%. Licensed vocational nurse hprd was significant ($\beta = .04$, $p = 0.003$) and positively associated with high-risk pressure ulcers. For every one-hour increase in LVN hprd, the number of residents with high-risk

pressure ulcers increased by 4 percentage points. Registered nurse hprd was approaching significance (β = .04, *p* = .08) and positively associated with high-risk pressure ulcers. For every one-hour increase in RN hprd, the number of residents with high-risk pressure ulcers increased by 4 percentage points. The control variables, CMI and resident age, were significant (β = .10, p < 0.0001), (β = – .004, *p* = .001), respectively. See Table 4.6.

Table 4.6: Hi Risk Pressure Ulcer Regression Table

Dependent	Model F (df1, df2)	Model *p*-value	Adjusted R^2	Independents	Parameter estimate	*p*-value*
High-risk pressure ulcer	6.76 (12, 605)	<.0001	0.1007	Intercept	0.26822	0 .0053
				RN hprd	0.04323	0.0787
				LVN hprd	0.03779	0.0026
				RN turnover	0.00260	0.8144
				LVN turnover	0.01819	0.2025
				RN contract hprd	0.02816	0.6293
				LVN contract hprd	-0.09084	0.2884
				Facility size	0.00171	0.6879
				Average CMI	0.09919	<.0001
				Urban/rural	-0.00216	0.6696
				Profit/nonprofit	-0.01002	0.1836
				Government	-0.00505	0.7241
				Average age	-0.00373	0.0009

*Significant at .05 level.

Question Two

What is the relationship between RN hours per resident day, RN turnover rate, percentage of RN time that is contract, LVN hours per resident day, LVN turnover rate, percentage of LVN time that is contract and the incidence of ADL decline, adjusting for facility size, case mix, geographic location (rural vs. urban), ownership, and resident age?

The regression model was significant (F (12,605) = 5.16, $p < .0001$) with an unadjusted R^2 of 9.3% and an adjusted R^2 of 7.5%. Of the six predictors, three were significant ($p < .05$): registered nurse hprd, licensed vocational nurse turnover rate, and registered nurse contract hprd. Registered nurse hprd ($\beta = .07$, $p = .014$) was significant and positively associated with ADL decline. For every one-hour increase in RN hprd, the number of residents with ADL decline increased by 7 percentage points. Licensed vocational nurse turnover rate ($\beta = .05$, $p = .001$) was significant and positively associated with ADL decline. For every 10 percentage-point increase in LVN turnover rate, ADL decline increased by 0.5 percentage points. Registered nurse contract hprd was significant and negatively associated with ADL decline ($\beta = -.19$, $p = .003$). For every one-hour increase in contract RN hprd, ADL decline decreases by 19 percentage points. Of the control variables, average CMI ($\beta = .10$, $p < 0.0001$) and average age ($\beta = .003$, $p = .01$) were both significant and positively associated with ADL decline. See Table 4.7.

Table 4.7: ADL Regression Table

Dependent	Model F (df1, df2)	Model *p*-value	Adjusted R^2	Independents	Parameter estimate	*p*-value*
ADL decline	5.16(12, 605)	< .0001	.07			
				Intercept	0.10639	0.0162
				RN hprd	0.06703	0.0142
				LVN hprd	0.00151	0.9134
				RN turnover	0.00646	0.6000
				LVN turnover	0.05150	0.0012
				RN contract hprd	-0.19343	0.0029
				LVN contract hprd	-0.00289	0.9757
				Facility size	-0.00605	0.2011
				Average CMI	0.09665	<.0001
				Urban/rural	-0.00625	0.2661
				Profit/nonprofit	0.00579	0.4886
				Government	-0.00525	0.7412
				Average age	0.00326	0.0087

*Significant at .05 level.

Question Three

What is the relationship between RN hours per resident day, RN turnover rate, percentage of RN time that is contract, LVN hours per resident day, LVN turnover rate, percentage of LVN time that is contract and the prevalence of weight loss, adjusting for facility size, case mix, geographic location (rural vs. urban), ownership, and resident age?

The regression model was significant (F (12,605) = 2.61, p = .002) with an unadjusted R^2 of 5% and an adjusted R^2 of 3%. Of the six predictors, registered nurse (RN) turnover rate was borderline significant (β = .02, p < .055). For every percentage-

point increase in RN turnover rate, there is a 2 percentage-point increase in residents with weight loss. The control variable, CMI, was significant ($\beta = .07$, $p < 0.0001$). See Table 4.8.

Table 4.8: Weight Loss Regression Table

Dependent	Model F (df1, df2)	Model *p*-value	Adjusted R^2	Independents	Parameter estimate	*p*-value*
Weight loss	2.61 (12, 605)	0.0021	0.0304	Intercept	-0.00640	0.9284
				RN hprd	0.01428	0.4336
				LVN hprd	–0.00548	0.5554
				RN turnover	0.01584	0.0549
				LVN turnover	–0.00766	0.4696
				RN contract hprd	–0.05816	0.1797
				LVN contract hprd	–0.02160	0.7338
				Facility size	–0.00448	0.1569
				Average CMI	0.06625	<.0001
				Urban/rural	–0.00024	0.9490
				Profit/nonprofit	–0.00141	0.8009
				Government	–0.00107	0.9195
				Average age	0.00023	0.7793

*Significant at .05 level.

Question Four

What is the relationship between RN hours per resident day, RN turnover rate, percentage of RN time that is contract, LVN hours per resident day, LVN turnover rate, percentage of LVN time that is contract and the use of physical restraints, adjusting for

facility size, case mix, geographic location (rural vs. urban), ownership, and resident age?

The regression model was significant (F (12,605) = 2.01, p =.022) with an unadjusted R^2 of 4% and an adjusted R^2 of 2%. Of the six predictors, licensed vocational nurse contract hours per resident day was significant and a second predictor, registered nurse hprd was approaching significance. Licensed vocational nurse contract hprd (β = .28, p = .0005) was significant and positively associated with physical restraints. For every 0.01 hour increase in LVN contract time (the statewide mean was 0.01), there was an increase in the use of physical restraints by 0.28 percentage points. Registered nurse hprd (β = –.04, p = .067) was approaching significance and negatively associated with physical restraints. For every one-hour increase in RN hprd, there was a decrease in the use of physical restraints by 4 percentage points. Of the control variables, the ownership type of government was significant and negatively associated with physical restraints (β = – .03, p = .052). See Table 4.9.

Table 4.9: Physical Restraint Regression Table

Dependent	Model F (df1, df2)	Model *p*-value	Adjusted R^2	Independents	Parameter estimate	*p*-value*
Physical restraint	2.01(12, 605)	0.0217	.02	Intercept	0.12697	0.1574
				RN hprd	–0.04219	0.0067
				LVN hprd	–0.01574	0.1791
				RN turnover	–0.00289	0.7807
				LVN turnover	0.01343	0.3142
				RN contract hprd	–0.02385	0.6622
				LVN contract hprd	0.27832	0.0005
				Facility size	–0.00231	0.5617
				Average CMI	–0.00233	0.9029
				Urban/rural	–0.00676	0.1537
				Profit/nonprofit	–0.00337	0.6320
				Government	–0.02610	0.0516
				Average age	–0.00059	0.5727

*Significant at .05 level.

Question Five

What is the relationship between RN hours per resident day, RN turnover rate, percentage of RN time that is contract, LVN hours per resident day, LVN turnover rate, and percentage of LVN time that is contract and the prevalence of low-risk pressure ulcers stages 1–4, adjusting for facility size, case mix, geographic location (rural vs. urban), ownership, and resident age? The regression model was not significant (F (12,605) = 1.06, p = .39), with an unadjusted R^2 of 2% and an adjusted R^2 of 0.0012. See Table 4.10.

Table 4.10: Low Risk Pressure Ulcer Regression Table

Dependent	Model F (df1, df2)	Model *p*-value	Adjusted R^2	Independents	Parameter estimate	*p*-value*
Low-risk pressure ulcer	1.06 (12, 605)	0.3880	0.0012	Intercept	-0.05712	0.0729
				RN hprd	0.00944	0.2467
				LVN hprd	0.00036	0.9302
				RN turnover	0.00338	0.3581
				LVN turnover	0.00555	0.2406
				RN contract hprd	–0.02159	0.2650
				LVN contract hprd	0.01595	0.5740
				Facility size	0.00182	0.1982
				Average CMI	0.00129	0.8484
				Urban/rural	0.00019	0.9103
				Profit/nonprofit	–0.00119	0.6348
				Government	0.00287	0.5455
				Average age	0.00075	0.0432

*Significant at .05 level.

Summary

Chapter 4 described the results of this research, including study population and sample, descriptive statistics and analysis, bivariate correlation, Pearson coefficient correlation, and the use of multiple regression analysis.

For the multiple regression analysis, five models were presented and discussed one for each quality outcome including: the incidence of ADL decline, physical restraint use, the prevalence of high-risk pressure ulcers stages 1–4, the prevalence of low-risk

pressure ulcers stages 1–4, and the prevalence of weight loss. The results were overall expected and representative of the study population and final sample. Preliminary data exploration analysis used a sample of 635, which was large enough to allow for conclusions and generalizability to the extent possible. These analyses included frequency and means for the independent, dependent, and control variables. Additional analyses included correlations between the independent and dependent variables and regression analyses to predict dependent variables from variables with control variables present. The correlation and regression analyses used a final sample of 618 facilities with complete data on all independent, dependent, and control variables. Four of five multiple regression models were overall significant and provided information about the relationship between the predictor variables and outcomes, much like those seen in previous research for comparison. Chapter 5 will further discuss results; including implications for this data in future research.

Chapter 5: Summary, Conclusions, and Recommendations

This chapter includes three sections: a summary of the results and discussion of the implications of the research findings; the limitations and strengths of the study; theoretical aspects for consideration, and recommendations for practice, research and policy. Four of five models were tested, and were significantly associated with ADL decline, pressure ulcers among high risk residents, use of physical restraints, and unintended weight loss. For describing the models, the questions have been ranked according to level of significance.

SUMMARY OF FINDINGS

As concerns remain about the future of aging services and the delivery of substandard care, approximately 16,000 nursing homes in the United States in 2009 (State Health Facts, 2011) continue to conduct the business of providing resident care twenty-four hours a day, seven days a week. As stated throughout this study, the problems are complex and far reaching in terms of the individuals affected. Life spans continue to lengthen, thus increasing the number of aging individuals who require services in the last years of life. Resident acuity levels additionally burden the system of aging services and continue to rise (Feng, Grabowski, Intrator, & Mor, 2006). Trained, dedicated staff that understands the unique needs of older persons with physical and cognitive limitations is critical to providing high quality care (Gray-Siracusa, 2005; IOM, 2001; Marek & Rantz, 2000; Spellbring, 2001). Hence the need for quality outcomes research continues to define the stated issues and drives this body of research forward. While this study has answered a number of questions others still remain and await further investigation into future research.

The overall aim of this study was to examine the association between licensed nurse hours of care through staffing levels—as defined by hours per resident day (hprd) for RNs, LVNs, contract RNs, and contract LVNs, and staff turnover rate—to five quality indicators. These include incidence of functional decline, use of physical restraints, prevalence of high-risk pressure ulcers stages 1–4, prevalence of low-risk pressure ulcers stages 1–4, and prevalence of unintended weight loss. This study used a cross-sectional descriptive design that included data regarding freestanding nursing facilities for 2007 in Texas (N = 618). Preliminary data exploration analysis used a preliminary sample of 635. These analyses included frequency and means for the independent, dependent, and control variables. Additional analyses included correlations between the independent and dependent variables and regression analyses to predict dependent variables from staffing variables with control variables present. The correlation and regression analyses used a final sample of 618 facilities with complete data on all independent, dependent, and control variables.

Question One: What is the relationship between RN hours per resident day, RN turnover rate, percentage of RN time that is contract, LVN hours per resident day, LVN turnover rate, and percentage of LVN time that is contract and the prevalence of high-risk pressure ulcers stages 1–4, adjusting for facility size, case mix, geographic location (rural vs. urban), ownership, and resident age?

The regression model for high-risk pressure ulcer stages 1–4 was significant. Licensed vocational nurse hprd was significant and positively associated with high-risk pressure ulcers. For every one-hour increase in LVN hprd, the number of residents with

high-risk pressure ulcers increased by 4 percentage points. Similar results have been reported in previous research that associated LPNs or LVNs with negative outcomes such as a higher incidence of pressure ulcers (Bostick, 2004; Castle & Myers, 2006; Decker, 2006; Dellefield, 2006a; Dorr et al., 2005; Gray-Siracusa, 2005; Harrington, Zimmerman, et al., 2000; Hendrix & Foreman, 2001; Horn et al., 2005; Zhang et al., 2006). One explanation may be that LVN programs in Texas as in other states are usually one year programs. While greater than 60% of charge nurses in long-term care are LVNs, the length of training needs further review to determine if additional educational opportunities might be beneficial in preparing an LVN for geriatric nursing in a nursing home setting (Harahan & Stone, 2009).

Residents who are in the high-risk pressure ulcer group meet the following criteria for this QI; the numerator includes residents with a pressure sore (stages 1–4) on the MDS 2.0 target assessment. The denominator for this QI includes all residents with a valid MDS 2.0 target assessment and any one of the following high-risk criteria: impaired bed mobility, transfer, comatose, or malnutrition. Exclusions are an admission assessment or the QI not triggering with triggering information missing on the assessment.

The need for further training has been discussed in some of the previous research noted throughout this study. With more than 270,000 LPNs and LVNs working in long-term care in the United States, greater responsibility is imposed on all nurses, including LVNs. With the baby boomer generation reaching retirement, an influx of aging seniors who will require long-term care services is expected (CMS, 2008c; Eljay, LLC, 2008; Feder et al., 2000; Kaiser Commission, 2006). This will require that individuals be

trained to understand geriatric nursing care. Furthermore, there is a need for nursing staff to know the specifics that are necessary to produce positive outcomes and decrease negative ones, such as the development of pressure ulcers.

LVNs in Texas, as in other states, are expected to take on the responsibility of managing the care of large nursing units. This includes, for example, a number of duties such as resident treatments for pressure ulcers, oversight of nurse aides' turning and repositioning the residents, and meal intake and eating, to name a few. Most LVN programs are completed within 12-18 months (Harahan & Stone, 2009). While the LVN contribution to long-term care is extremely valuable, a number of topics need to be reviewed in terms of training specific to aging, critical thinking skills, and organization of work. LVNs could benefit from additional education and training, as noted by a number of researchers (Dyck, 2007; Hawes, 2003; IOM, 2001; Mezey & Harrington, 2006; Mezey, Mitty, & Burger, 2008; Shipman & Hooten, 2007). This may be in the form of a special mentoring program for all new LVN graduates who plan to work in a long-term care setting or by other means. The issues related to the need for additional training for LVNs require attention at the legislative level in order to raise awareness about the importance of LVN education and to give this topic the attention it deserves. With this awareness comes the need to inform the legislators and policy makers of the needs for financial assistance or incentives that promote additional LVN education to help prepare them for the role of charge nurse in a long-term care facility.

According to the National Council of State Boards of Nursing, charge nurse positions make up a large number of the staff in long-term care settings, with over 60%

of LVNs performing the role of charge nurse. Furthermore, in some states, to work in a nursing home in any role, LPNs or LVNs work as the only other licensed nursing staff besides the director of nursing (Harahan & Stone, 2009).

For this study, registered nurse hprd was approaching significance and positively associated with high-risk pressure ulcers. For every one-hour increase in RN hprd, the number of residents with high-risk pressure ulcers increased by 4 percentage points. Collier (2008) reported similar findings in research of staffing levels and quality outcomes with one explanation that must be considered as a viable concern—that lower staffing levels may contribute to underpowered analyses and therefore provide a less representative finding of the population of study. Collier's research was similar to this current study, having a higher number of nursing facilities with a sample size of more than 900 California nursing facilities, compared to this study's more than 600 Texas nursing facilities.

According to Kash et al. (2007), in a study completed in Texas nursing facilities where the OSCAR and Medicaid Cost Reports data sources were compared, the mean difference between the two was only 3% for staffing levels combined for RNs, LVNs, and CNAs. When evaluating the statistical analysis for RN staffing levels reported on the OSCAR, there was a 38% higher RN level than was reported on the Medicaid Cost Report. Considerations must be given to inconsistencies in how states are reporting data in relation to the OSCAR reporting system as opposed to the Medicaid Cost Report. With the OSCAR report, data may reflect higher staffing levels in comparison to the Medicaid Cost Report because it is provided under different circumstances where nursing home

staff is expected to locate and provide staffing information quickly for state or federal surveyors who are requesting the information. This can be less accurate and present with a greater risk for errors given the short timeframe to locate and provide this information.

Another possible explanation for high-risk pressure ulcers' approaching significance and relationship to RN hprd is the higher CMI results seen in this study. Greater resource needs is related to residents who have greater physical needs, including a higher incidence of pressure ulcers and other co-morbidities. Zhang and Grabowski's (2004) results for high-risk pressure ulcers were similar to this study in that CMI, which is an estimate of the amount of staff resources and time spent providing care based on each resident's acuity and age, were higher, reflecting greater care needs and risk for decline. In nursing homes with residents who have higher acuity needs, RN staffing may be higher than is normally seen in other nursing homes that admit residents with lower acuity needs and possibly contributes to counterintuitive quality outcomes. Further research needs to be conducted to determine what factors most specifically contribute to counterintuitive data results.

Further research is needed related to this study's large sample size of more than 600 nursing facilities and the low RN hprd percentages reported. There is a concern regarding the ability to determine what impact this might have on the usefulness of this analysis without future research on this finding. Further explanation is as follows: for this study, the average RN hprd in Texas nursing homes for 2007 compared to the national average hprd was low. The Texas RN hprd mean was 0.23, which translates into approximately 13 minutes over 24 hours per resident compared to the national mean of

0.6 or 36 minutes over 24 hours per resident. Although the national average for RN hprd for 2007 was significantly higher than the Texas average, the national average for 2007 reflected a 14% decrease in RN time compared to calculations for national averages in past years. Furthermore, this finding is counterintuitive compared to previous research for staffing levels and quality outcomes (Castle & Myers, 2006; Decker, 2006; Hendrix & Foreman, 2001; Horn et al., 2005; Weech-Maldonado, Meret-Hanke, Neff, & Mor, 2004), and similar counterintuitive results have been reported in quality outcomes research (Bostick, 2002, 2004; Collier, 2008; and Gray-Siracusa, 2005). Additionally, the p value of .08 for RN hprd may not represent a reportable finding that warrants true significance and should be considered a point of reference for future research purposes.

The independent variables RN contract hours, LVN contract hours, RN turnover rate, and LVN turnover rate were not significant for this model. The control variables of CMI and resident age were both significant in the high-risk pressure ulcer model. A number of risk factors increase along with age, including the risk for functional decline (Figaro et al., 2006). Furthermore, as functional decline occurs, the tendency toward incontinence of bowel and bladder may develop along with the inability to turn and reposition without assistance. When these issues develop, if there is a shortage of qualified staff to assist with increased care needs, there is a greater risk for the development of pressure ulcers.

In summary, pressure ulcers remain a major concern in long-term care for a number of reasons—pain for the resident, the risk of infection, and costs associated with staff and treatment supplies, to name a few. The continued efforts of the interdisciplinary

team in long-term care are necessary to address these issues and others associated with pressure ulcer treatment.

Question Two: What is the relationship between RN hprd, RN turnover rate, percentage of RN time that is contract, LVN hprd, LVN turnover rate, and percentage of LVN time that is contract and the incidence of ADL decline, adjusting for facility size, case mix, geographic location (rural vs. urban), ownership, and resident age?

For this study, the regression model for the incidence of ADL decline was significant. Registered nurse hprd was significant and positively associated with ADL decline. For every one-hour increase in RN hprd, the number of residents with ADL decline increased by 7 percentage points. This is another example of a counterintuitive finding as described previously in question one for the independent variable high-risk pressure ulcer. Bostick (2004) reported similar results in a study for RN staffing and quality outcomes and reported the absence of significant findings for RN hprd on late-loss ADLs. Bostick argued that fewer RNs work in direct-care positions in nursing homes than in other care settings due to the lower percentage of RNs in long-term care in general. This is most often due to the higher cost related to paying RNs. Hospitals and acute care settings generally hire more RN staff to work with patients unlike nursing homes where few RNs are employed. In 2000, 59% of the RN population worked in a hospital setting in the U.S. compared to only 7% in nursing homes, (The U.S. Department of Health and Human Services Bureau of Health Professions, 2011). The nursing home percentage is reflective of the mostly management positions held by an RN compared to direct care. Furthermore, direct-care staff, mostly nurse aides, generally facilitate ADL

care for nursing home residents, including eating, toileting, transferring, and bed mobility. As previously discussed in question one, the nursing homes that reflect higher percentages of RN time may have greater care needs in the first place, including higher acuity needs, impaired mobility, and ADL decline.

The LVN turnover rate was significant and positively associated with ADL decline. For every 10 percentage-point increase in LVN turnover rate, ADL decline increased by 0.5 percentage points. Staff turnover, including the turnover of LVN staff, is prevalent in the long-term care industry and is a present concern as identified in the literature (Bostick, 2004; Castle & Engberg, 2006; Decker, Matthews-Martin, Dollard, Tuckner, & Bizette, 2003; Kash, Castle, et al., 2007).

According to a survey conducted by the Texas Center for Nursing Workforce Studies in 2008, the LVN turnover rate in nursing homes for Texas in 2007 was 44%, slightly lower than the national rate of 50% for the same year. Staff turnover is problematic in long-term care and continues to be an ongoing concern because of the many negative outcomes such as ADL decline. Sometimes new nursing staff do not receive programs that mentor or provide detailed orientation. New staff must have extra time and attention to help them feel part of the nursing team and to become familiar with the various areas of long-term care in a nursing facility (Halfer, 2007). Additionally nursing staff may have little or no knowledge of geriatric nursing or care of the aging before working in a nursing home. As a result, staff turnover often occurs and negatively affects the continuity of resident care because it creates a shortage of staff and the constant need to replace staff due to a void or shortage. Furthermore, these issues

contribute to the use of agency or contract nursing staff (Castle & Myers, 2006; Bourbonniere et al., 2006). Although there is published research regarding turnover of nursing staff, the need remains for continued research specific to quality and resident outcomes (Castle & Myers, 2006).

Contract RN hprd was significant and negatively associated with ADL decline. For every one-hour increase in contract RN hprd, ADL decline decreases by 19 percentage points. Although this was not an expected result, similar findings have been reported in studies that evaluated staffing levels and the relationship to quality outcomes (Bostick, 2004; Bourbonniere et al. 2006; Collier, 2008; and Gray-Siracusa, 2005). Collier (2008), Harrington and Swan (2003), and Harrington (2005) all noted that this phenomenon requires further research to better understand the implications behind the data results—more specifically, to understand the affects of the endogenous relationship among the variables.

For this study, RN contract hprd was low, with a mean of .01, which translates into .06 hprd, or 36 seconds over a 24-hour period per resident. This extremely low percentage of time involving contract RN hprd does not add meaning and does not truly reflect a measurable relationship given the low percentage of RN contract hprd. Bourbonniere et al. (2006) conducted a longitudinal study of contract nursing staff, evaluating the use of contract nurse staffing in nursing homes. The authors recommended including only those nursing homes with 5% or greater contract nursing staff. As noted in this study and in previous research in comparison, the number of hours that contract nursing staff works in long-term care is generally much lower than the number of hours

worked by regularly employed nursing staff in a nursing home. Because the number of hours worked by contract nursing staff in a nursing home is generally lower, evaluating nursing homes that use 5% or greater contract nursing staff may be useful in future research. Additionally, using this approach to exclusion may increase the power of the study with a larger sample of staff to draw conclusions about the research and contribute to results that are more meaningful.

The following independent variables were not significant in this model: RN turnover rate, LVN hours per resident day, and LVN contract hours. Of the control variables, average age again contributed significantly to the model and was positively associated with ADL decline. This in turn can affect the level of acuity and increase the need for greater resources, including increased hours of staff time as identified in previous research (Gray-Siracusa, 2005; Harrington & Swan, 2003; Konetzka, Yi, Norton, & Kirkpatrick, 2004; Wan et al., 2006; Zimmerman et al., 2002).

In summary, ADL decline is commonly seen in long-term care. As residents age and develop increased functional loss, ADL decline becomes a concern that must be managed by the staff that provides care for the residents. This issue must be addressed as an ongoing concern and solutions must be provided that address this issue from a variety of angles, including increasing the number of nursing staff who work with the residents and provide care on a daily basis.

Question Three: What is the relationship between RN hours per resident day, RN turnover rate, percentage of RN time that is contract, LVN hours per resident day, LVN turnover rate, and percentage of LVN time that is contract and the prevalence of weight

loss, adjusting for facility size, case mix, geographic location (rural vs. urban), ownership, and resident age?

The regression model for weight loss was significant. Of the six predictors, RN turnover rate was approaching significance. For every percentage-point increase in RN turnover rate, there is a 2 percentage-point increase in residents with weight loss. The shortage of RN staff in nursing homes and RN turnover negatively affects how well weight maintenance is managed and supervised, including the stabilization of residents who are at risk (Kayser-Jones, 2000, 1999, 1997). With staff turnover, new staff may not know the residents well and take longer to get familiar with the residents. This requires a great deal of diligence on the part of staff in monitoring residents who are at risk for weight loss. Additionally, this requires that the staff that monitor and assist the residents during meals and snack time become familiar with each resident's individual eating habits. The concerns related to weight loss and malnutrition have been addressed in previous research as associated with quality outcomes (Bostick et al., 2006; Dyck, 2007; Kayser-Jones, 2000, 1999, 1997; Shipman & Hooten, 2007).

In 2007, Dyck completed a secondary analysis evaluating the relationship between staffing and resident outcomes, including weight loss and dehydration. Approximately 3,000 nursing homes in six states were included. RN leadership was noted as an important part of improving outcomes, including weight stabilization. The seriousness of weight loss has been approached from various angles in long-term care, including evaluating the underlying causes or factors that contribute to it. While some residents may suffer from a terminal illness and weight loss may be expected, other residents may not have a diagnosis that supports weight loss. When a nursing facility experiences RN turnover, there are negative issues associated with every aspect of weight

loss, from assessment of needs to oversight of other staff during meal time. There is not one single solution to this problem.

Shipman and Hooten (2007) noted the importance of supervisory oversight of direct-care staff, especially that provided by an RN. Additionally noted was the significance in terms of residents who are at risk for weight loss or have a prior history of weight loss. Oversight by staff that monitors the direct-care staff and ensures that residents are eating and drinking regularly affects weight stabilization over time, which RN turnover interrupts. Adequate RN staffing is critical to nursing homes for oversight and leadership of other staff (Shipman & Hooten, 2007).

Gray-Siracusa (2005) noted that RN staffing was associated with a decrease in the incidence of weight loss. RN leadership and oversight are critical to positive resident outcomes. Having enough staff trained to provide the time and attention to those who reside in a nursing home is a crucial part in the effort to meet residents' needs. The turnover of RN staff is a contributing factor seen in quality outcomes research for long-term care (Castle & Myers, 2006; Decker, 2006; Dellefield, 2006a, 2006b; Dorr, Horn, & Smout, 2005; Harrington & Swan, 2003; Harrington, Zimmerman, et al., 2000; Hendrix & Foreman, 2001; Horn et al., 2005; Shipman & Hooten, 2007; Weech-Maldonado et al., 2004; Zimmerman, Gruber-Baldini, Hebel, Sloane, & Magaziner, 2002).

The following independent variables were not significant in this model: RN hours per resident day, LVN hours per resident day, RN and LVN contract hours, and LVN turnover rate. The control variable CMI was significant. This has been identified in previous research and is frequently associated with higher acuity needs such as weight loss, pressure ulcer development, and ADL decline (Gray-Siracusa, 2005; Harrington & Swan, 2003; Konetzka, Yi, Norton, & Kirkpatrick, 2004; Wan et al., 2006; Zimmerman et al., 2002).

In summary, weight loss is often the result of a terminal illness or catastrophic event in the life of a resident; however, these are not always the reasons. The members of the interdisciplinary team, including the dietician, RN and other nursing staff, physician, and others, must work together to identify the best course of action regarding staff oversight and assistance with meals and fluid intake if the resident can eat and drink orally. Effective strategies for addressing nutrition and weight loss issues need to be determined through goals and interventions that are individualized for each nursing home resident.

Question Four: What is the relationship between RN hours per resident day, RN turnover rate, percentage of RN time that is contract, LVN hours per resident day, LVN turnover rate, and percentage of LVN time that is contract and the use of physical restraints, adjusting for facility size, case mix, geographic location (rural vs. urban), ownership, and resident age?

The regression model for physical restraints was overall significant. Of the six predictors, one was significant and a second was approaching significance. LVN contract hprd was significant and positively associated with physical restraints. Contract LVN nursing hours reflects the greatest percentage of variance identified in any predictor variable for this study. For every 0.01 hour increase in LVN contract time (the statewide average is 0.01), there is an increase in the use of physical restraints of 0.28 percentage points. The mean for LVN contract hprd for this study was extremely low, as was previously reported for contract RN hprd. For LVN hprd, the mean was .009, or 32 seconds of care provided by an LVN over a 24-hour period per resident. This extremely low percentage of time involving contract LVN hprd does not add meaning and does not truly reflect a measurable relationship given the low percentage of LVN contract hprd.

Previous research specific to the association of LVN-contract nursing staff and the increased use of physical restraints could not be located in the published literature. However, research was located that addressed similar issues for a number of other quality-related outcomes in nursing homes. The use of agency or contract nursing in long-term care is a concern that affects the continuity of care (Guillard, 2000) and quality of care for the residents who live in nursing homes throughout the United States. As staff members leave long-term care for various reasons and hiring of new staff sometimes lags, vacancies increase and may not be filled for some time. This vicious cycle leaves yet another void that must be filled by someone who can care for the residents and often leads to the use of agency staffing (Castle, 2006; Bourbonniere, Feng, Intrator, Angelelli, Mor, & Zinn, 2006).

According to the Agency for Healthcare Research and Quality, from 1992 to 2002 LVN contract nursing staff use increased from 6% to 14%. Furthermore, facilities that used agency nursing staff more than 5% above their established full-time equivalent (FTE) staff experienced negative outcomes, including quality of care citations on regulatory reviews.

Bourbonniere et al. (2006) conducted a longitudinal study of contract nursing staff, evaluating the use of contract nurse staffing in nursing homes. The authors recommended including only those nursing homes with 5% or greater contract nursing staff. As noted in this study and in previous research in comparison, the number of hours that contract nursing staff works in long-term care is generally much lower than the hours of regularly employed nursing staff in a nursing home. As a result, evaluating nursing homes that use 5% or greater contract nursing staff may be useful in future research. Additionally, using this approach to exclusion may increase the power of the study with a

larger sample of staff to draw conclusions about the research and contribute to results that are more meaningful.

RN hprd was approaching significance and was negatively associated with physical restraints. Although not statistically significant, in concept the results reflect that as RN hours increase, physical restraint use decreases in a nursing home. This is consistent with previous research. In a study conducted by Castle (2000), nursing facilities with more than 100 beds and with more RN hprd were less likely to use physical restraints. This finding supports the results of this study regarding RN hprd and physical restraint use.

Since OBRA 87, the use of physical restraints has been increasingly scrutinized. This is partly due to education and awareness, which are positive reflections of the importance of this issue. The majority of physical restraint devices used in nursing homes, does not allow the resident to move freely and can be frustrating for the resident. These devices can also increase the risk of behavioral problems. Additionally, because physical restraints are constricting, for residents with memory loss, they may increase the risk for falls and entrapment in the restraints. Physical restraints can be dangerous, even posing a risk of death (Grabowski, Angelelli, & Mor, 2004; Letizia, Babler, & Cockrell, 2004; Sullivan-Marx, Strumpf, Evans, Baumgarten, & Maislin, 1999; Weech-Maldonado et al., 2004; Zhang & Grabowski, 2004). In recent years, staff and family education has been a major contributing factor in terms of better understanding the safety issues and risks involved with the use of restraints. This has helped by raising staff awareness and by promoting and teaching safe alternatives to restraint use.

In 2009, the College and Association of Registered Nurses of Alberta took a stand for reducing restraint use by RNs, encouraging them to exhaust all alternatives before using restraints, if possible. This practice requires careful assessment by the RN and

advocacy on behalf of the resident or client. This mind-set is required to change old practices and implement safer new ones. Additionally, social workers in long-term care can partner with the nursing staff to address issues associated with restraint education and reiterate the messages that physical restraints are not appropriate in most situations and that safer, less restrictive alternatives should be identified.

Staff awareness and education continue to be important points in eliminating physical restraint use. Although restraint reduction is commendable, the ultimate goal should remain restraint elimination. Greater emphasis on staff education and residents' families' or responsible parties' education is additionally important in the efforts to eliminate physical restraints. Educational efforts must place greater emphasis on the dangers that physical restraints pose to the general welfare and safety of residents. Nursing staff can greatly affect families' attitudes toward restraints by conveying consistent information that is reiterated among all staff who works closely with the residents. Nursing staff can work with family members by presenting factual information while providing support for those who need reassurance about the safety of their loved ones. Restraint elimination requires a partnership focused on quality of care and quality of life.

The following independent variables were not significant in this model: LVN hours per resident day, RN contract hours, RN turnover rate, and LVN turnover rate.

The control variable, government (ownership type) was significant and negatively associated with physical restraints. Research specific to the use of physical restraints in government-owned nursing homes could not be located. A little over 3% of Texas nursing homes are government owned. Some of these homes have strict guidelines related to care; for example, the Texas Veterans Commission oversees seven (33%) of the government homes in Texas (Texas Veterans Commission, 2011). Requirements are that

these homes must have RN coverage 24 hours a day, 7 days a week, unlike the majority of other nursing homes in which RN coverage is required for only 8 hours of each day. RN leadership and oversight of staff may be a positive factor in terms of less restraint use for these homes given that there is 24-hour coverage by an RN. Government homes generally have greater regulatory oversight and are scrutinized closely for the care provided, as seen in veterans homes, where the Veterans Commission imposes additional regulatory requirements and closer monitoring of care and practices provided.

In summary, while physical restraint use in long-term care settings has declined over the past several years, it has not been eliminated. Misuse or a poor understanding of restraints can lead staff to cause additional problems if they do not have a good understanding of the regulatory requirements for physical restraint use. The research points to a positive trend for restraint reduction in Texas and throughout the United States in many nursing homes. This trend must continue to be an important topic for staff who work in nursing homes and regulators at both the state and national levels.

Question Five: What is the relationship between RN hours per resident day, RN turnover rate, percentage of RN time that is contract, LVN hours per resident day, LVN turnover rate, and percentage of LVN time that is contract and the prevalence of low-risk pressure ulcers in stages 1–4, adjusting for facility size, case mix, geographic location (rural vs. urban), ownership, and resident age?

The regression model for low-risk pressure ulcers was not significant. There was no association found between any of the independent or control variables tested in the regression models and low-risk pressure ulcers. Although low-risk pressure ulcers occur in long-term care less frequently than high-risk pressure ulcers, this category of QI still requires constant monitoring. According to Abt Associates Inc. (2003), a low-risk pressure ulcer is classified as one that develops on a resident who is generally at low risk

for the development of pressure ulcers. To be low risk resident must not be qualified for inclusion in the high-risk group.

In summary, although the model for low-risk pressure ulcers was not significant, this remains an important topic and one that must continue to be monitored and addressed. As efforts toward quality improvement continue related to low-risk pressure ulcers, nursing systems must be maintained that identify key points as appropriate for this quality measure.

LIMITATIONS

This study has a number of limitations. The ability to generalize to states other than Texas is limited. The data is from only one state, although Texas is a very large state in terms of population. There are approximately 1,100 nursing homes where a representative population exists from which to draw a random sample for data purposes (CMS, 2008a). The final count of the remaining number of nursing facilities with all data available for analysis was 618. Similar research has been conducted in previous studies, and further testing should be completed before conclusions are drawn about how this research can be applied to other populations.

A second limitation that exists in this study is that it is a secondary analysis with a degree of uncertainty about the data and unknown issues related to the process for the collection of data. For example, the original data for this study was collected for many purposes with a number of staff members involved in accomplishing the necessary work with the data. The Medicaid data that was derived from the Medicaid Cost Report was collected for reimbursement and tracking of nursing-home–specific information such as number and type of staff members, specifics about the facility and facility services, and

costs for services provided throughout the year. The HHSC in Texas stores and manages the Medicaid Cost Report data.

The MDS data was collected from nursing homes throughout the United States for a number of reasons, some of which involved reimbursement purposes and resident assessment purposes, including a determination of RUG III level or category. This determines the resource group that the resident is assigned to and identifies the level of care for resources needed. The QI report based on the MDS provides resident data about the quality of care as documented by nursing staff in nursing homes throughout the United States. Furthermore, the report provides a means by which comparisons can be drawn, based on state and national benchmarking. The large number of files that could not be merged was close to 400 and was a significant limitation that could not be resolved between the Medicaid Cost Report Data from the Health and Human Services Commission and the MDS-QI data from CMS. Consequently, missing data was problematic and required extra attention to detail and management throughout the study. A limitation associated with missing data is the amount of time that was required to manage issues or problems that came about during the study. Each problem must be individually addressed and solutions identified before the research can move forward.

The accuracy of the data cannot be verified in secondary analysis due to a number of individuals working with the data over a period of time. Additionally, there may be limitations related to data entry errors that require data cleaning to reduce the risk of this occurrence. This process was timely and required attention to detail over a period of time in preparation for running the data analysis. It requires full attention and must be accomplished methodically. Having multiple data sources can be challenging because researchers must deal with different processes, systems, and staff who are trained under different protocols. Working with a number of organizations requires that one become

familiar with the specific protocols and requirements of each to ensure that the guidelines are met accordingly. This limitation increases the amount of time spent sorting through the data due to the many varying requirements that must be met for each organization.

An example is the guidelines for data storage at the University of Texas at Austin, School of Nursing, and those established by the CMS. Both organizations have protocols and strict guidelines, yet they vary in some regard. They must all be met to ensure safe storage of data for analysis. The use of large data sets in general demands close attention to quality, especially in research using secondary data. Ultimately, one of the greatest challenges was working through the large data set and remaining patient with the process.

The low reimbursement rate for Texas at 49th in the nation was a limitation. It is difficult for staff to provide quality care when the reimbursement rate for Texas nursing facilities is so low. Additionally, the low reimbursement rate negatively affects the ability for nursing facilities to hire nursing staff when they cannot afford to pay competitive wages. Many nursing facilities can barely afford the necessities for each resident (Eaton, 1995; 1996; Feng, Grabowski, Intrator, Zinn, & Mor, 2008).

The low ratio of RNs in Texas nursing homes was a limitation. The RN hprd average for Texas is lower than the national average, while the LVN hprd average is higher. In 2007, the national average of RN hprd was 0.6, or 36 minutes in 24 hours, and the national average of LVN hprd was 0.8, or 48 minutes in 24 hours (Kaiser, 2011). Both positive and negative consequences that are associated with both adequate and inadequate RN staffing has been described extensively throughout this study.

Finally, the low percentage of non-profit nursing homes in Texas was a limitation with less than 14% total (Kaiser, 2011). The low Texas Medicaid reimbursement rate negatively affects the ability for non-profit organizations to remain active as a viable business given the issues of limiting funding. There are few government incentives to

supplement the low reimbursement rates. Many nursing facilities simply cannot afford to remain in business without strong financial backing through other means such as endowments or other funding to sustain viability.

STRENGTHS

A major strength for this study was the ability to draw from a combination of data sources that included, the Texas Medicaid Cost Report, the MDS 2.0 and Quality measures. As previously noted, the Medicaid Cost Report is a more accurate data source in comparison to the Online Survey certification and Reporting (OSCAR) data (Kash, Hawes, and Phillips, 2007). A second strength for this study was having the availability of a large population of nursing facilities for a data sample given the high number of nursing facilities in Texas. Based on data from 2009, Texas falls second in size in the United States in number of nursing facilities at 1,174 nursing homes compared to California's 1,226 nursing homes (Kaiser, 2011).

THEORETICAL FRAMEWORK DISCUSSION

Donabedian's framework has guided a number of outcome investigations in healthcare research over the years and has been widely published since the 1960's (Dellefield, 2000; 2003; Dyck, 2007; Mitchell, Ferketich, & Jennings, 1998; Harrington, 2001; 2005; & Reilly et al, 2006). More specifically and in relation to this study, Donabedian's framework has guided many of the developments in nursing home quality outcomes and regulatory reform (Dellefield, 2000). For this study, Donabedian's framework did not fully support the findings in regard to some of the counterintuitive results of the regression models. While this framework has been appropriate for quality outcomes research in the past, a number of changes have taken place in long-term care over the past decade that has changed the dynamics of quality outcomes for example the culture change movement (Ragsdale & McDougall, 2008). While these changes are

creating positive outcomes, they create challenges that require re-evaluating nursing systems to determine what continues to be relevant. A number of nursing homes throughout the United States are moving away from traditional linear models such as Donabedian's framework. Greater emphasis may be warranted for developing new frameworks that support the changes seen in long-term care today. A different approach to how a theoretical framework is used may need to be tested in support of newer models of care delivery. This would also speak to the idea of innovative cultures that are being seen more in long-term care such as with the culture changes movement (Nieboer & Strating, 2011). While Donabedian's framework provides a template for structure, process, and outcome, for this study process was not evaluated, only structure and outcome. For further discussion in future research, the possibility remains that there may be some explanation accounted for in the research variables for the process part of Donabedian's framework in this study. This discussion can be examined in future research.

CONCLUSION

This study evaluated the relationship between six independent variables and five dependent variables, controlling for resident and organizational characteristics. There were both expected and unexpected results in the data. Four of five regression models were tested and found to be significant for ADL decline, high-risk pressure ulcers, physical restraint, and weight loss. The outcome variable of low-risk pressure ulcers was the only resident outcome that was not significant. The need remains for continued research that further defines the association of licensed staff to resident outcomes. Effective solutions that work within budgetary and bureaucratic constraints in the nursing home setting must be considered as viable options. Workforce issues related to the

shortage of staff require creative strategies that strengthen recruitment and retention efforts. Licensed staff education in areas specific to the aging population is needed, and that education must include basics of care to prevent avoidable decline, such as functional loss due to lack of exercise or depression related to inactivity and social isolation.

The issues associated with the nurse turnover rates need consideration in order to improve the quality of care in nursing homes, more specifically, resident outcomes such as a decrease in pressure ulcers and weight loss. As previously stated, the turnover rate in the nursing home and long-term care organizations is costly for the employer, but more important; it has a negative impact on resident outcomes that, sadly, extends to the costs for quality of care and quality of life.

Additionally, staff turnover detracts from an already burdened workforce, increasing further instability and greatly affecting the continuity in resident care (CMS, 2001; IOM, 2004). The nursing home staff that continues to work and take on more because of the staff shortage continuously struggles with the negative issues associated with staff turnover. The results of turnover are also a reminder that care is not being provided to the expectation of the resident, family, provider, or public. Consequently, staff turnover is a major concern for nursing home care providers much of the time.

There is a continued need to decrease and ultimately eliminate the use of contract nursing throughout nursing homes to every extent possible. Although there are specified requirements for the number of nurses working in a nursing home each shift (U.S. General Accounting Office, 1987), there are also negative issues associated with inconsistency of nursing staff when agency nursing staff must work to meet staffing requirements. The research continues to identify concerns with the continuity of care and the positive effects of a stable workforce.

Licensed staffing and its relationship to quality outcomes is an important area of research that will continue to grow in significance. As the baby boomer population continues to age and the need for caregivers of nursing home residents continues to increase, answers will be sought in an effort to relieve staff shortages and improve the quality of long-term care. It is vital that legislators, key stakeholders, and providers of long-term care unite in this effort through research, advocacy, and education. Although there has been a tremendous amount of research conducted, as presented in this study, government reports, journal articles, studies, and various other publications sufficiently document that the need to further define the key issues related to staffing levels and quality outcomes remains unmet. The research to date has not brought about enough change in these areas to declare success throughout the long-term care industry as a whole.

Other challenges that must be faced are the volatile condition of the economy, the levels of state and federal funding, and the unstable workforce. These factors impose conditions that affect change today and into the future of long-term care. As stated earlier, there are extensive inconsistencies throughout the research regarding uniformity of operational definitions (Dellefield, 2000; Harrington, 2005; IOM, 2001). Consistency in the long-term care industry regarding what the needs are is critical so that when legislators and key stakeholders are approached, providers and others who are called on to maintain staffing that meets the needs of the aging population can clearly articulate those needs. While this study provided new answers and validated some that were previously addressed by other research, the need remains for continued research that will move this body of knowledge forward.

RECOMMENDATIONS FOR NURSING PRACTICE

Shipman and Hooten (2007) found that RN oversight of nurse aides and direct-care staff is an issue that is critical to resident care. This is seen in every aspect of resident activities of daily living and in meeting nutritional needs to name a few. Staff assistance with eating, drinking, oversight, and encouragement of eating is vital to maintaining residents' health. Registered nurses who have worked in long-term care and understand the processes of care for geriatric nursing can guide other nurses and staff, including LVNs, nurse aides, and other clinical staff. The RN role as leader and manager is very important in promoting education among the nursing team in long-term care and ultimately reducing negative outcomes. Shipman and Hooten (2007) further noted that inadequate staffing levels lead to a failure to meet the basic needs of nursing home residents and contribute to poor resident outcomes such as malnutrition and dehydration.

For now, nursing homes must rely on smaller numbers of staff to care for large numbers of residents with varying degrees of health service needs. Attracting new RNs as they graduate from the nursing programs without having worked is a challenge. This is an example of a situation that sometimes leads to the loss of new nursing staff. New graduate nurses need the opportunity to have a mentor who works with them to provide guidance and support. Recently graduated nurses are not always considered to be a priority when staffing shortages are occurring. Nursing staff are frequently burdened with the day-to-day running of the nursing home, so often new staff must find out a great deal about the processes of care through a trial-and-error approach (Halfer, 2007).

As discussed in detail earlier in this study, LPNs and LVNs were associated with negative findings in 10 out of 18 studies. Examples include increased deficiencies, increased cost of pressure ulcer care, possible worsening of clinical outcomes, and

increased incidence of urinary tract infections, to name a few (Castle & Myers, 2006; Gray-Siracusa, 2005; Hendrix & Foreman, 2001).

With more than 270,000 LPNs and LVNs working in long-term care in the United States, greater responsibility is imposed on all nurses. LVNs in Texas, as in other states, are expected to take on the responsibility of managing the care of large nursing units, including the oversight of assigned staff, for example, nurse aides and medication aides. According to the National Council of State Boards of Nursing, charge nurse positions make up a large number of the staff in long-term care settings, with over 60% of LVNs performing the role of charge nurse. Furthermore, in some states, to work in a nursing home in any role, LPNs or LVNs work as the only other licensed nursing staff besides the director of nursing (Harahan & Stone, 2009).

According to the U.S. Department of Labor's Bureau of Labor Statistics (2008), most programs for LPNs and LVNs last approximately one year and are taught at a community, technical, or vocational school. With only one year of training, much of what the LPN/LVN learns is basic education that does not delve into critical thinking skills. Unfortunately, one-year licensed nurses do not always receive the mentoring or hands-on training that is so greatly needed (Dyck, 2007; Hawes, 2003; IOM, 2001; Mezey & Harrington, 2006; Mezey, Mitty, & Burger, 2008; National Citizens' Coalition for Nursing Home Reform, 2008; Shipman & Hooten, 2007).

While the LVN contribution to long-term care is extremely valuable, the role they often serve in terms of its high level of responsibility needs to be reviewed with regard to the training specific to aging, critical thinking skills, and organization of work. LVNs could benefit from additional education and training, as noted by a number of researchers (Dyck, 2007; Hawes, 2003; IOM, 2001; Mezey & Harrington, 2006; Mezey, Mitty, & Burger, 2008; Shipman & Hooten, 2007). This may be in the form of a special mentoring

program for all new LVN graduates who plan to work in a long-term care setting or by other means. The issues related to the need for additional training for LVNs would require attention at the legislative level in order to raise awareness about the importance of LVN education and to give this topic the attention it deserves.

While some nurses learn on the job and over time, this is not the ideal method for all geriatric-related nursing education; the process and approach need careful consideration. This is especially true for new nurses who graduate and begin working in long-term care immediately or within a short time after graduation. Long-term care suffers from staff shortages on a continual basis. Few programs offer incentives through which nursing staff can afford to return to school, take a class, or build self-esteem through the advancement of educational opportunities. Such incentives are important for the empowerment of nursing staff. They need to continue their educational journey and to be supported by their managers during this time. Administrators, directors of nursing, and other managers need to support and encourage staff to return to school, to take a class for professional growth, and to attain their goals, offering them help along the way. Nursing staff who work in long-term care are heavily burdened with the day to day management of nursing and are not always aware of available opportunities for professional growth. Nursing managers need to take the time to locate this information and share it with the nursing staff.

The role of mentor by more experienced nurses in long-term care is vital to the success of the future of long-term care nursing. Mentoring of new staff by an experienced nurse who understands long-term care nursing systems may make the difference between a nurse becoming comfortable with working in a long-term care setting or becoming frustrated and leaving the job. While nurse turnover continues to be an ongoing issue and significant concern in long-term care, nurse retention is equally as important and needs to

be approached as a goal for a positive solution in addressing nurse turnover. The need is ongoing for staff to brainstorm innovative ideas on how nursing staff can be mentored in the early months of taking on a new job as a nurse who is newly graduated from nursing school or is new to long-term care nursing (Barba, 2007; Campbell, 2003; Castle & Engberg, 2006; Halfer, 2007;Mezey, Mitty, & Burger, 2008).

In a publication written by McConnell, Lekan, and Corazzini (2010), the authors discuss issues associated with the increasingly complex care of nursing home residents. Their main argument is that, given the increased resident acuity needs, the need for staff trained to provide care according to the resident's individual needs is great. A number of concerns related to staff competency are problematic regarding the nurse's ability to be a role model and provide leadership to and oversight of others. The authors further argue that universities, through education specific to geriatric nursing, can address the issues identified if this is added to programs of instruction. Further discussion should address the fact that having staff educated and trained in geriatric nursing equips nursing homes to deal with the many challenges that face the long-term care population. McConnell et al. note the need for increased RN coverage and consistency of staffing levels (numbers) of nursing staff employed in long-term care.

In conclusion, nursing practice and education are areas that must be viewed as important by all stakeholders involved. Education strengthens nursing practice by providing a stable foundation from which the nurse can get a good start before actually going into the area of geriatric nursing. Mentoring of new nursing staff can make a difference in how well new or inexperienced nurses acclimate to the long-term care setting, it can strengthen the workforce by helping new nurses to feel a part of the nursing team and a valued team member.

RECOMMENDATIONS FOR NURSING RESEARCH

This study was the first in Texas to look at this group of variables and use the Medicaid Cost Report, along with the MDS QI report and MDS 2.0 assessment. Future research should focus on several areas of importance for aging services. Long-term care is often overlooked in funding for research purposes, and whenever grants or other such awards are made available, these may present opportunities that are smaller scale yet may still serve as a viable option. Long-term care organization, management, and other administrative staff must develop strategies for staying in tune to such grant funding for research opportunities and work toward aligning with major universities. Strength in numbers is one of the ways that success is obtained in today's competitive market for funding sources in long-term care.

Another consideration for a long-term care research opportunity is with the development of a program for nursing homes addressing quality improvement and staff retention. One such program is available through the American Nurse's Credentialing Center (ANCC)'s Pathway to Excellence whereby long-term care organizations commit to raising the bar through the commitment to improving quality with development of best practice standards. A number of resources are available through the ANCC to assist interested stakeholders and staff with understanding how the program can benefit the organization as well as determining how to develop appropriate goals. The Pathway to Excellence in Long-Term Care Program is another example of approaching quality improvement from the perspective of collaboration and partnership. This program is

another example of one where alternative solutions are pursued versus traditional funded research where there is limited funding for long-term care organizations.

In two separate studies, (Harrington & Swan, 2003; Harrington 2005) raised questions about the topic of endogenous variables in quality research along with the importance of addressing this issue if it should become problematic in the regression models tested. According to Harrington et al. (2003), some problematic issues seen in quality and staffing research are counterintuitive and may be the result of endogenous variables.

For example, in a 2005 research report, Harrington wrote that nursing facilities that have a higher CMI for residents with higher acuity needs should be utilizing more staff accordingly due to the need for an increased percentage of nursing care. Studies that reflect higher percentages of staffing due to increased acuity needs sometimes reflect counterintuitive results. The higher staffing accommodation can create a counterintuitive effect in the research findings. Thus outcomes require careful evaluation to determine more specifically the underlying factors that may positively or negatively affect data results. One example is the prevention of high risk pressure ulcers. One solution to address the prevention of pressure ulcers is by increasing the percentage of nurse staffing hours. By accommodating the higher acuity needs of residents who are at risk for pressure ulcer development, increased nurse staffing may reflect an inverse relationship in the data results that suggests that pressure ulcers are getting worse.

A second example residents who have a pressure ulcer(s) on admission to the nursing home and are receiving treatment after an admission from a hospital stay. In this

type of situation, higher nurse staffing hours would be needed to provide care in which case this should lead to a positive relationship between nurse staffing and pressure ulcers. Further research is still needed and may be approached by looking at nursing homes that are actively working to prevent pressure ulcers compared to nursing homes with higher percentages of resident admissions with pressure ulcers. This comparison may shed light on counterintuitive outcome results.

Further research is needed to better understand the role each control variable of significant finding plays in quality outcomes research in long-term care, for example the control variables of case-mix index and age. While we have some information about these variables, further investigation to determine the extent of the relationship in terms of the quality of care provided by nursing staff and resource needs may be helpful. This would provide additional information regarding how to staff according to actual staffing needs for each nursing facility's acuity level. It is the hope that as research continues to define the role of each variable and how they interact, a better understanding will develop that allows researchers to draw more definitive conclusions.

RECOMMENDATIONS FOR NURSING POLICY

Health care costs in nursing homes continue to rise each year. The challenge of providing care that is within budgetary alignment is one of the major contributing factors to staff shortage. If viable, cost-effective solutions can be developed that will increase the number of nursing staff in nursing homes, legislators may acknowledge the need for additional funding in long-term care nursing. This seems to be an ongoing, uphill battle

that has taken center stage during the most recent Texas legislative session (82nd). As the cost of long-term care stands without further reductions, Texas is not positively positioned in comparison to other states. As previously stated in this study, Texas's national ranking for Medicaid reimbursement in long-term care is forty-ninth (State Health Facts, 2011). The low reimbursement rate negatively affects facilities' ability to maintain adequate staffing levels. Many providers can barely afford the necessities for each resident. This problem seems to be a vicious cycle in terms of providing what is needed to care for the residents while maintaining standards that meet the minimum level of care. While the quality of care is a significant issue, there must be a balance.

According to a report from the Texas House of Representatives with the budget proposal for fiscal year 2012–2013, the potential exists for further cuts in Texas Medicaid funding, which will continue to complicate an already burdened long-term care system if this does occur (State Finance Report, 2011). Each time funding issues are discussed, along with the topic of needs that are ever growing in long-term care, alternative measures are sought. Solutions that will give long-term care a comfortable position in regard to the overall financial structure of the long-term care industry is an ever-present concern for all long-term care stakeholders. Texas is not alone in this issue. There are a number of other states around the nation working tirelessly on a continual basis at the state capital and in Washington, DC, to reform long-term care. However, there does not seem to be a magical solution or answer that will solve the many woes of financially supporting long-term care. Texas nursing home residents and nursing home staff depends on the advocacy work of state associations such as the Texas Association of Homes and

Services for the Aging (TAHSA) and the Texas Health Care Association (THCA). Through the efforts of these state associations, the voice of long-term care is collectively heard. The executive leadership staff along with other key stakeholders collaborate and network on a continual basis in support of long-term care reform, addressing issues that nursing homes face on a continual basis. Many of these issues are related to budgetary constraints and low Medicaid reimbursement rates. Texas remains approximately $800 million below the cost of caring for elderly nursing home residents in the Medicaid program (Human Services Committee Report, 49 and Texas Association of Homes and Services for the Aging, 2011).

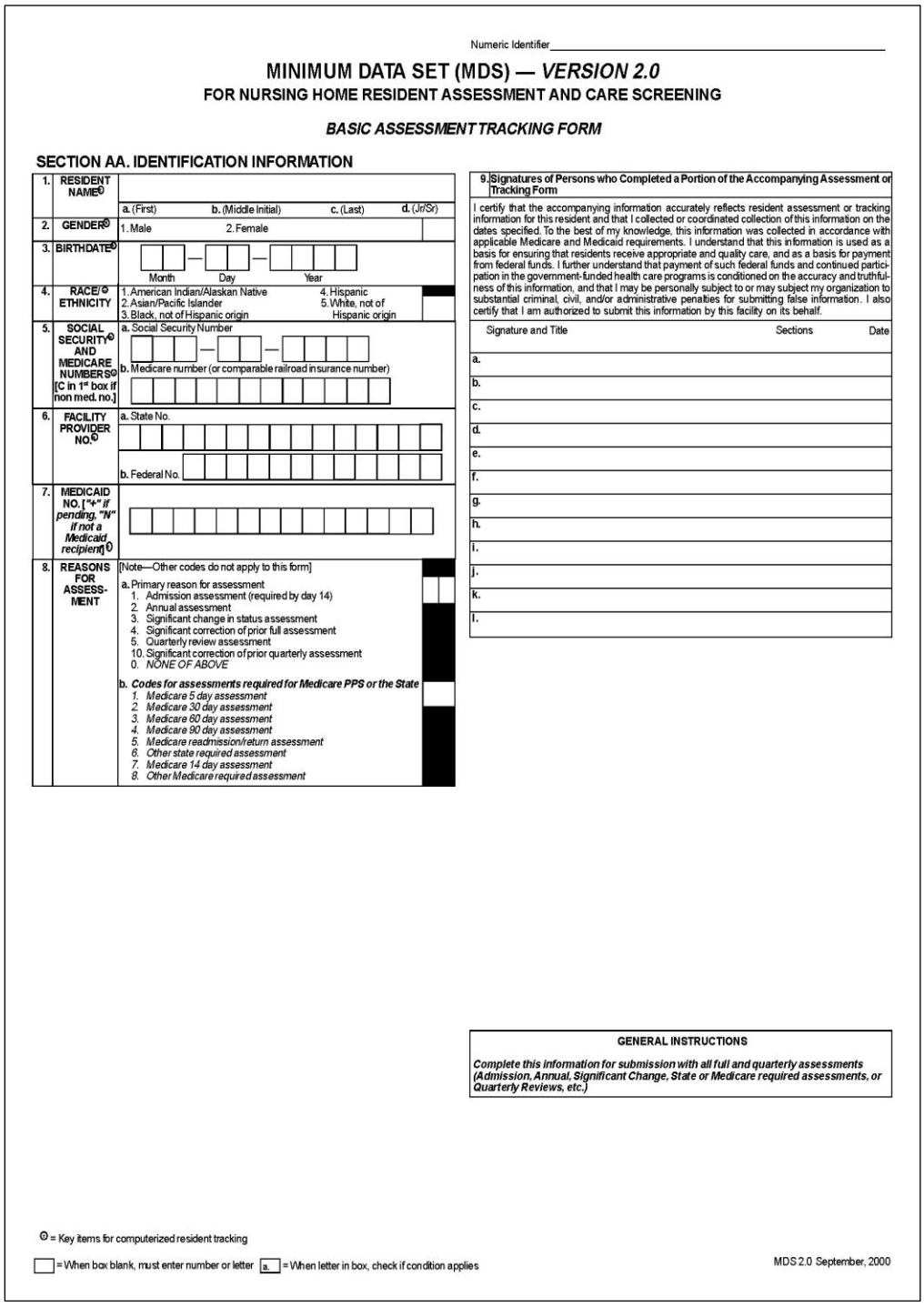
Because of so many concerns that remain in long-term care, researchers and political activists from around the nation confront Washington's policymakers, continue to tell the story, and keep the most important burning issues alive. One such example, as described earlier in this study, was provided by Dr. Catherine Hawes, a policy analyst and health services researcher (Testimony before the U.S. Senate Committee on Finance, 2003). Hawes provided testimony about the state of affairs regarding the care provided to residents who live in nursing homes. Very eloquently stated, Hawes expressed the sentiment of many Americans who know that long-term care facilities can be better if greater consideration is given to this cause, the cause of aging with grace and dignity. Hawes argued that the most significant contributing factor to poor quality of care is insufficient staff—simply not having enough staff to provide adequate resident care. While there are limited funding sources available for programs in long-term care, meeting the needs of aging seniors who live out their lives in nursing homes must be a

priority. They must be considered in terms of staff and resource needs. Furthermore, the contributions they have made to society during their lifetimes paved the way for the baby boomers and generations to come; the sacrifices they made during their lifetime are immeasurable.

In closing, the voice of long-term care must be heard in the nation's capital and must start with every state legislature as a commitment to the reform of aging services. This should be an expectation of every long-term care stakeholder. This includes those who work in long-term care, family members of those who live in long-term care, concerned citizens at large, and the policy makers. These are the individuals who have a vested interest and have the responsibility to make decisions in the best interest of each and every frail elder that lives in a long-term care facility around the nation. Without a firm commitment and combined efforts of many, quality of care, adequate staffing needs, and other important areas of long-term care nursing will suffer.

Appendices

APPENDIX 1: MINIMUM DATA SET TOOL



Numeric Identifier_____

MINIMUM DATA SET (MDS) — *VERSION 2.0*

FOR NURSING HOME RESIDENT ASSESSMENT AND CARE SCREENING

BASIC ASSESSMENT TRACKING FORM

SECTION AA. IDENTIFICATION INFORMATION

1.	RESIDENT NAME©	a. (First) b. (Middle Initial) c. (Last) d. (Jr/Sr)
2.	GENDER©	1. Male 2. Female
3.	BIRTHDATE©	Month Day Year
4.	RACE/© ETHNICITY	1. American Indian/Alaskan Native 2. Asian/Pacific Islander 3. Black, not of Hispanic origin 4. Hispanic 5. White, not of Hispanic origin
5.	SOCIAL SECURITY© AND MEDICARE NUMBERS© [C in 1st box if non med. no.]	a. Social Security Number b. Medicare number (or comparable railroad insurance number)
6.	FACILITY PROVIDER NO.©	a. State No. b. Federal No.
7.	MEDICAID NO. ["+" if pending, "N" if not a Medicaid recipient]©	
8.	REASONS FOR ASSESS-MENT	[Note—Other codes do not apply to this form] a. Primary reason for assessment 1. Admission assessment (required by day 14) 2. Annual assessment 3. Significant change in status assessment 4. Significant correction of prior full assessment 5. Quarterly review assessment 10. Significant correction of prior quarterly assessment 0. *NONE OF ABOVE* b. ***Codes for assessments required for Medicare PPS or the State*** *1. Medicare 5 day assessment* *2. Medicare 30 day assessment* *3. Medicare 60 day assessment* *4. Medicare 90 day assessment* *5. Medicare readmission/return assessment* *6. Other state required assessment* *7. Medicare 14 day assessment* *8. Other Medicare required assessment*

9. Signatures of Persons who Completed a Portion of the Accompanying Assessment or Tracking Form

I certify that the accompanying information accurately reflects resident assessment or tracking information for this resident and that I collected or coordinated collection of this information on the dates specified. To the best of my knowledge, this information was collected in accordance with applicable Medicare and Medicaid requirements. I understand that this information is used as a basis for ensuring that residents receive appropriate and quality care, and as a basis for payment from federal funds. I further understand that payment of such federal funds and continued participation in the government-funded health care programs is conditioned on the accuracy and truthfulness of this information, and that I may be personally subject to or may subject my organization to substantial criminal, civil, and/or administrative penalties for submitting false information. I also certify that I am authorized to submit this information by this facility on its behalf.

Signature and Title	Sections	Date
a.		
b.		
c.		
d.		
e.		
f.		
g.		
h.		
i.		
j.		
k.		
l.		

GENERAL INSTRUCTIONS

Complete this information for submission with all full and quarterly assessments (Admission, Annual, Significant Change, State or Medicare required assessments, or Quarterly Reviews, etc.)

© = Key items for computerized resident tracking

☐ = When box blank, must enter number or letter a ☐ = When letter in box, check if condition applies

MDS 2.0 September, 2000

Resident _____ Numeric Identifier _____

MINIMUM DATA SET (MDS) — *VERSION 2.0*

FOR NURSING HOME RESIDENT ASSESSMENT AND CARE SCREENING

BACKGROUND (FACE SHEET) INFORMATION AT ADMISSION

SECTION AB. DEMOGRAPHIC INFORMATION

1.	DATE OF ENTRY	*Date the stay began. Note — Does not include readmission if record was closed at time of temporary discharge to hospital, etc. In such cases, use prior admission date* Month — Day — Year	
2.	ADMITTED FROM (AT ENTRY)	1. Private home/apt. with no home health services 2. Private home/apt. with home health services 3. Board and care/assisted living/group home 4. Nursing home 5. Acute care hospital 6. Psychiatric hospital, MR/DD facility 7. Rehabilitation hospital 8. Other	
3.	LIVED ALONE (PRIOR TO ENTRY)	0. No 1. Yes 2. In other facility	
4.	ZIP CODE OF PRIOR PRIMARY RESIDENCE		
5.	RESIDENTIAL HISTORY 5 YEARS PRIOR TO ENTRY	(***Check all settings*** *resident* ***lived in*** *during 5 years prior to date of entry given in item AB1 above)*	
		Prior stay at this nursing home	a.
		Stay in other nursing home	b.
		Other residential facility—board and care home, assisted living, group home	c.
		MH/psychiatric setting	d.
		MR/DD setting	e.
		NONE OF ABOVE	f.
6.	LIFETIME OCCUPATION(S) [Put "/" between two occupations]		
7.	EDUCATION (*Highest Level Completed*)	1. No schooling 2. 8th grade/less 3. 9-11 grades 4. High school 5. Technical or trade school 6. Some college 7. Bachelor's degree 8. Graduate degree	
8.	LANGUAGE	(*Code for correct response*) a. Primary Language 0. English 1. Spanish 2. French 3. Other	
		b. If other, specify	
9.	MENTAL HEALTH HISTORY	Does resident's RECORD indicate any history of mental retardation, mental illness, or developmental disability problem? 0. No 1. Yes	
10.	CONDITIONS RELATED TO MR/DD STATUS	(***Check all conditions*** *that are related to MR/DD status that were manifested before age 22, and are likely to continue indefinitely)*	
		Not applicable—no MR/DD (Skip to AB11)	a.
		MR/DD with organic condition	
		Down's syndrome	b.
		Autism	c.
		Epilepsy	d.
		Other organic condition related to MR/DD	e.
		MR/DD with no organic condition	f.
11.	DATE BACKGROUND INFORMATION COMPLETED	Month — Day — Year	

SECTION AC. CUSTOMARY ROUTINE

1.	CUSTOMARY ROUTINE (*In year prior to DATE OF ENTRY to this nursing home, or year last in community if now being admitted from another nursing home*)	(***Check all that apply.*** *If all information UNKNOWN, check last box only)*	
		CYCLE OF DAILY EVENTS	
		Stays up late at night (e.g., after 9 pm)	a.
		Naps regularly during day (at least 1 hour)	b.
		Goes out 1+ days a week	c.
		Stays busy with hobbies, reading, or fixed daily routine	d.
		Spends most of time alone or watching TV	e.
		Moves independently indoors (with appliances, if used)	f.
		Use of tobacco products at least daily	g.
		NONE OF ABOVE	h.
		EATING PATTERNS	
		Distinct food preferences	i.
		Eats between meals all or most days	j.
		Use of alcoholic beverage(s) at least weekly	k.
		NONE OF ABOVE	l.
		ADL PATTERNS	
		In bedclothes much of day	m.
		Wakens to toilet all or most nights	n.
		Has irregular bowel movement pattern	o.
		Showers for bathing	p.
		Bathing in PM	q.
		NONE OF ABOVE	r.
		INVOLVEMENT PATTERNS	
		Daily contact with relatives/close friends	s.
		Usually attends church, temple, synagogue (etc.)	t.
		Finds strength in faith	u.
		Daily animal companion/presence	v.
		Involved in group activities	w.
		NONE OF ABOVE	x.
		UNKNOWN—Resident/family unable to provide information	y.

SECTION AD. FACE SHEET SIGNATURES

SIGNATURES OF PERSONS COMPLETING FACE SHEET:

a. Signature of RN Assessment Coordinator — Date

I certify that the accompanying information accurately reflects resident assessment or tracking information for this resident and that I collected or coordinated collection of this information on the dates specified. To the best of my knowledge, this information was collected in accordance with applicable Medicare and Medicaid requirements. I understand that this information is used as a basis for ensuring that residents receive appropriate and quality care, and as a basis for payment from federal funds. I further understand that payment of such federal funds and continued participation in the government-funded health care programs is conditioned on the accuracy and truthfulness of this information, and that I may be personally subject to or may subject my organization to substantial criminal, civil, and/or administrative penalties for submitting false information. I also certify that I am authorized to submit this information by this facility on its behalf.

Signature and Title	Sections	Date
b.		
c.		
d.		
e.		
f.		
g.		

☐ = When box blank, must enter number or letter [a.] = When letter in box, check if condition applies

MDS 2.0 September, 2000

Resident _____ Numeric Identifier _____

MINIMUM DATA SET (MDS) — *VERSION 2.0*
FOR NURSING HOME RESIDENT ASSESSMENT AND CARE SCREENING
FULL ASSESSMENT FORM

(Status in last 7 days, unless other time frame indicated)

SECTION A. IDENTIFICATION AND BACKGROUND INFORMATION

1. RESIDENT NAME — a. (First) b. (Middle Initial) c. (Last) d. (Jr/Sr)

2. ROOM NUMBER

3. ASSESSMENT REFERENCE DATE
a. *Last day of MDS observation period* — Month — Day — Year
b. Original (0) or corrected copy of form (enter number of correction)

4a. DATE OF REENTRY — Date of reentry from most recent temporary discharge to a hospital in last 90 days (or since last assessment or admission if less than 90 days)
Month — Day — Year

5. MARITAL STATUS — 1. Never married 2. Married 3. Widowed 4. Separated 5. Divorced

6. MEDICAL RECORD NO.

7. CURRENT PAYMENT SOURCES FOR N.H. STAY — (*Billing Office to indicate;* ***check all that apply in last 30 days***)
a. Medicaid per diem
b. Medicare per diem
c. Medicare ancillary part A
d. Medicare ancillary part B
e. CHAMPUS per diem
f. VA per diem
g. Self or family pays for full per diem
h. Medicaid resident liability or Medicare co-payment
i. Private insurance per diem (including co-payment)
j. Other per diem

8. REASONS FOR ASSESSMENT — ***[Note—If this is a discharge or reentry assessment, only a limited subset of MDS items need be completed]***
a. Primary reason for assessment
1. Admission assessment (required by day 14)
2. Annual assessment
3. Significant change in status assessment
4. Significant correction of prior full assessment
5. Quarterly review assessment
6. Discharged—return not anticipated
7. Discharged—return anticipated
8. Discharged prior to completing initial assessment
9. Reentry
10. Significant correction of prior quarterly assessment
0. *NONE OF ABOVE*

b. ***Codes for assessments required for Medicare PPS or the State***
1. *Medicare 5 day assessment*
2. *Medicare 30 day assessment*
3. *Medicare 60 day assessment*
4. *Medicare 90 day assessment*
5. *Medicare readmission/return assessment*
6. *Other state required assessment*
7. *Medicare 14 day assessment*
8. *Other Medicare required assessment*

9. RESPONSIBILITY/ LEGAL GUARDIAN — (***Check all that apply***)
a. Legal guardian
b. Other legal oversight
c. Durable power of attorney/health care
d. Durable power of attorney/financial
e. Family member responsible
f. Patient responsible for self
g. *NONE OF ABOVE*

10. ADVANCED DIRECTIVES — (*For those items with supporting* ***documentation*** *in the medical record,* ***check all that apply***)
a. Living will
b. Do not resuscitate
c. Do not hospitalize
d. Organ donation
e. Autopsy request
f. Feeding restrictions
g. Medication restrictions
h. Other treatment restrictions
i. *NONE OF ABOVE*

SECTION B. COGNITIVE PATTERNS

1. COMATOSE — (*Persistent vegetative state/no discernible consciousness*) 0. No 1. Yes (**If yes, skip to Section G**)

2. MEMORY — (*Recall of what was learned or known*)
a. Short-term memory OK—seems/appears to recall after 5 minutes 0. Memory OK 1. Memory problem
b. Long-term memory OK—seems/appears to recall long past 0. Memory OK 1. Memory problem

3. MEMORY/ RECALL ABILITY — (***Check all*** *that resident was* ***normally able to recall during last 7 days***)
a. Current season
b. Location of own room
c. Staff names/faces
d. That he/she is in a nursing home
e. *NONE OF ABOVE* are recalled

4. COGNITIVE SKILLS FOR DAILY DECISION-MAKING — (*Made decisions regarding tasks of daily life*)
0. *INDEPENDENT*—decisions consistent/reasonable
1. *MODIFIED INDEPENDENCE*—some difficulty in new situations only
2. *MODERATELY IMPAIRED*—decisions poor; cues/supervision required
3. *SEVERELY IMPAIRED*—never/rarely made decisions

5. INDICATORS OF DELIRIUM—PERIODIC DISORDERED THINKING/ AWARENESS — (*Code for behavior in the* ***last 7 days.)*** ***[Note: Accurate assessment requires conversations with staff and family who have direct knowledge of resident's behavior over this time]***.
0. Behavior not present
1. Behavior present, not of recent onset
2. Behavior present, over last 7 days appears different from resident's usual functioning (e.g., new onset or worsening)

a. EASILY DISTRACTED—(e.g., difficulty paying attention; gets sidetracked)
b. PERIODS OF ALTERED PERCEPTION OR AWARENESS OF SURROUNDINGS—(e.g., moves lips or talks to someone not present; believes he/she is somewhere else; confuses night and day)
c. EPISODES OF DISORGANIZED SPEECH—(e.g., speech is incoherent, nonsensical, irrelevant, or rambling from subject to subject; loses train of thought)
d. PERIODS OF RESTLESSNESS—(e.g., fidgeting or picking at skin, clothing, napkins, etc; frequent position changes; repetitive physical movements or calling out)
e. PERIODS OF LETHARGY—(e.g., sluggishness; staring into space; difficult to arouse; little body movement)
f. MENTAL FUNCTION VARIES OVER THE COURSE OF THE DAY—(e.g., sometimes better, sometimes worse; behaviors sometimes present, sometimes not)

6. CHANGE IN COGNITIVE STATUS — Resident's cognitive status, skills, or abilities have changed as compared to status of **90 days ago** (or since last assessment if less than 90 days)
0. No change 1. Improved 2. Deteriorated

SECTION C. COMMUNICATION/HEARING PATTERNS

1. HEARING — (*With hearing appliance, if used*)
0. *HEARS ADEQUATELY*—normal talk, TV, phone
1. *MINIMAL DIFFICULTY* when not in quiet setting
2. *HEARS IN SPECIAL SITUATIONS ONLY*—speaker has to adjust tonal quality and speak distinctly
3. *HIGHLY IMPAIRED* absence of useful hearing

2. COMMUNICATION DEVICES/ TECHNIQUES — (***Check all that apply*** *during last 7 days*)
a. Hearing aid, present and used
b. Hearing aid, present and not used regularly
c. Other receptive comm. techniques used (e.g., lip reading)
d. *NONE OF ABOVE*

3. MODES OF EXPRESSION — (***Check all used*** *by resident to make needs known*)
a. Speech
b. Writing messages to express or clarify needs
c. American sign language or Braille
d. Signs/gestures/sounds
e. Communication board
f. Other
g. *NONE OF ABOVE*

4. MAKING SELF UNDERSTOOD — (*Expressing information content—however able*)
0. *UNDERSTOOD*
1. *USUALLY UNDERSTOOD*—difficulty finding words or finishing thoughts
2. *SOMETIMES UNDERSTOOD*—ability is limited to making concrete requests
3. *RARELY/NEVER UNDERSTOOD*

5. SPEECH CLARITY — (*Code for speech in the* ***last 7 days***)
0. *CLEAR SPEECH*—distinct, intelligible words
1. *UNCLEAR SPEECH*—slurred, mumbled words
2. *NO SPEECH*—absence of spoken words

6. ABILITY TO UNDERSTAND OTHERS — (*Understanding verbal information content—however able*)
0. *UNDERSTANDS*
1. *USUALLY UNDERSTANDS*—may miss some part/intent of message
2. *SOMETIMES UNDERSTANDS*—responds adequately to simple, direct communication
3. *RARELY/NEVER UNDERSTANDS*

7. CHANGE IN COMMUNICATION/ HEARING — Resident's ability to express, understand, or hear information has changed as compared to status of **90 days ago** (or since last assessment if less than 90 days)
0. No change 1. Improved 2. Deteriorated

☐ = When box blank, must enter number or letter a. = When letter in box, check if condition applies

Resident _____ Numeric Identifier _____

SECTION D. VISION PATTERNS

1.	VISION	(*Ability to see in adequate light and with glasses if used*) 0. *ADEQUATE*—sees fine detail, including regular print in newspapers/books 1. *IMPAIRED*—sees large print, but not regular print in newspapers/ books 2. *MODERATELY IMPAIRED*—limited vision; not able to see newspaper headlines, but can identify objects 3. *HIGHLY IMPAIRED*—object identification in question, but eyes appear to follow objects 4. *SEVERELY IMPAIRED*—no vision or sees only light, colors, or shapes; eyes do not appear to follow objects	
2.	VISUAL LIMITATIONS/ DIFFICULTIES	Side vision problems—decreased peripheral vision (e.g., leaves food on one side of tray, difficulty traveling, bumps into people and objects, misjudges placement of chair when seating self)	a.
		Experiences any of following: sees halos or rings around lights; sees flashes of light; sees "curtains" over eyes	b.
		NONE OF ABOVE	c.
3.	VISUAL APPLIANCES	Glasses; contact lenses; magnifying glass 0. No 1. Yes	

SECTION E. MOOD AND BEHAVIOR PATTERNS

1. INDICATORS OF DEPRESSION, ANXIETY, SAD MOOD

(***Code for indicators observed in last 30 days, irrespective of the assumed cause***)
0. Indicator not exhibited in last 30 days
1. Indicator of this type exhibited up to five days a week
2. Indicator of this type exhibited daily or almost daily (6, 7 days a week)

VERBAL EXPRESSIONS OF DISTRESS

a. Resident made negative statements—e.g., "*Nothing matters; Would rather be dead; What's the use; Regrets having lived so long; Let me die*"

b. Repetitive questions—e.g., "*Where do I go; What do I do?*"

c. Repetitive verbalizations—e.g., calling out for help, ("*God help me*")

d. Persistent anger with self or others—e.g., easily annoyed, anger at placement in nursing home, anger at care received

e. Self deprecation—e.g., "*I am nothing; I am of no use to anyone*"

f. Expressions of what appear to be unrealistic fears—e.g., fear of being abandoned, left alone, being with others

g. Recurrent statements that something terrible is about to happen—e.g., believes he or she is about to die, have a heart attack

h. Repetitive health complaints—e.g., persistently seeks medical attention, obsessive concern with body functions

i. Repetitive anxious complaints/concerns (non-health related) e.g., persistently seeks attention/ reassurance regarding schedules, meals, laundry, clothing, relationship issues

SLEEP-CYCLE ISSUES

j. Unpleasant mood in morning

k. Insomnia/change in usual sleep pattern

SAD, APATHETIC, ANXIOUS APPEARANCE

l. Sad, pained, worried facial expressions—e.g., furrowed brows

m. Crying, tearfulness

n. Repetitive physical movements—e.g., pacing, hand wringing, restlessness, fidgeting, picking

LOSS OF INTEREST

o. Withdrawal from activities of interest—e.g., no interest in long standing activities or being with family/friends

p. Reduced social interaction

2.	MOOD PERSISTENCE	**One or more indicators** of depressed, sad or anxious mood **were not easily altered by attempts to "cheer up", console, or reassure the resident over last 7 days** 0. No mood indicators 1. Indicators present, easily altered 2. Indicators present, not easily altered	
3.	CHANGE IN MOOD	Resident's mood status has changed as compared to status of **90 days ago** (or since last assessment if less than 90 days) 0. No change 1. Improved 2. Deteriorated	

4. BEHAVIORAL SYMPTOMS

(A) ***Behavioral*** *symptom* ***frequency in last 7 days***
0. Behavior not exhibited in last 7 days
1. Behavior of this type occurred 1 to 3 days in last 7 days
2. Behavior of this type occurred 4 to 6 days, but less than daily
3. Behavior of this type occurred daily

(B) ***Behavioral*** *symptom* ***alterability in last 7 days***
0. Behavior not present OR behavior was easily altered
1. Behavior was not easily altered

	(A)	(B)
a. WANDERING (moved with no rational purpose, seemingly oblivious to needs or safety)		
b. VERBALLY ABUSIVE BEHAVIORAL SYMPTOMS (others were threatened, screamed at, cursed at)		
c. PHYSICALLY ABUSIVE BEHAVIORAL SYMPTOMS (others were hit, shoved, scratched, sexually abused)		
d. SOCIALLY INAPPROPRIATE/DISRUPTIVE BEHAVIORAL SYMPTOMS (made disruptive sounds, noisiness, screaming, self-abusive acts, sexual behavior or disrobing in public, smeared/threw food/feces, hoarding, rummaged through others' belongings)		
e. RESISTS CARE (resisted taking medications/ injections, ADL assistance, or eating)		

5.	CHANGE IN BEHAVIORAL SYMPTOMS	Resident's behavior status has changed as compared to **status of 90 days ago** (or since last assessment if less than 90 days) 0. No change 1. Improved 2. Deteriorated	

SECTION F. PSYCHOSOCIAL WELL-BEING

1.	SENSE OF INITIATIVE/ INVOLVEMENT	At ease interacting with others	a.
		At ease doing planned or structured activities	b.
		At ease doing self-initiated activities	c.
		Establishes own goals	d.
		Pursues involvement in life of facility (e.g., makes/keeps friends; involved in group activities; responds positively to new activities; assists at religious services)	e.
		Accepts invitations into most group activities	f.
		NONE OF ABOVE	g.
2.	UNSETTLED RELATIONSHIPS	Covert/open conflict with or repeated criticism of staff	a.
		Unhappy with roommate	b.
		Unhappy with residents other than roommate	c.
		Openly expresses conflict/anger with family/friends	d.
		Absence of personal contact with family/friends	e.
		Recent loss of close family member/friend	f.
		Does not adjust easily to change in routines	g.
		NONE OF ABOVE	h.
3.	PAST ROLES	Strong identification with past roles and life status	a.
		Expresses sadness/anger/empty feeling over lost roles/status	b.
		Resident perceives that daily routine (customary routine, activities) is very different from prior pattern in the community	c.
		NONE OF ABOVE	d.

SECTION G. PHYSICAL FUNCTIONING AND STRUCTURAL PROBLEMS

1. (A) ADL SELF-PERFORMANCE—(***Code for resident's PERFORMANCE OVER ALL SHIFTS during last 7 days***—*Not including setup*)
0. *INDEPENDENT*—No help or oversight —OR— Help/oversight provided only 1 or 2 times during last 7 days
1. *SUPERVISION*—Oversight, encouragement or cueing provided 3 or more times during last7 days —OR— Supervision (3 or more times) plus physical assistance provided only 1 or 2 times during last 7 days
2. *LIMITED ASSISTANCE*—Resident highly involved in activity; received physical help in guided maneuvering of limbs or other nonweight bearing assistance 3 or more times —OR—More help provided only 1 or 2 times during last 7 days
3. *EXTENSIVE ASSISTANCE*—While resident performed part of activity, over last 7-day period, help of following type(s) provided 3 or more times:
—Weight-bearing support
— Full staff performance during part (but not all) of last 7 days
4. *TOTAL DEPENDENCE*—Full staff performance of activity during entire 7 days
8. *ACTIVITY DID NOT OCCUR* during entire 7 days

(B) ADL SUPPORT PROVIDED—(***Code for MOST SUPPORT PROVIDED OVER ALL SHIFTS during last 7 days; code regardless*** *of resident's self-performance classification*)
0. No setup or physical help from staff
1. Setup help only
2. One person physical assist
3. Two+ persons physical assist
8. ADL activity itself did not occur during entire 7 days

			(A) SELF-PERF	(B) SUPPORT
a.	BED MOBILITY	How resident moves to and from lying position, turns side to side, and positions body while in bed		
b.	TRANSFER	How resident moves between surfaces—to/from: bed, chair, wheelchair, standing position (EXCLUDE to/from bath/toilet)		
c.	WALK IN ROOM	How resident walks between locations in his/her room		
d.	WALK IN CORRIDOR	How resident walks in corridor on unit		
e.	LOCOMOTION ON UNIT	How resident moves between locations in his/her room and adjacent corridor on same floor. If in wheelchair, self-sufficiency once in chair		
f.	LOCOMOTION OFF UNIT	How resident moves to and returns from off unit locations (e.g., areas set aside for dining, activities, or treatments). **If facility has only one floor**, how resident moves to and from distant areas on the floor. If in wheelchair, self-sufficiency once in chair		
g.	DRESSING	How resident puts on, fastens, and takes off all items of **street clothing**, including donning/removing prosthesis		
h.	EATING	How resident eats and drinks (regardless of skill). Includes intake of nourishment by other means (e.g., tube feeding, total parenteral nutrition)		
i.	TOILET USE	How resident uses the toilet room (or commode, bedpan, urinal); transfer on/off toilet, cleanses, changes pad, manages ostomy or catheter, adjusts clothes		
j.	PERSONAL HYGIENE	How resident maintains personal hygiene, including combing hair, brushing teeth, shaving, applying makeup, washing/drying face, hands, and perineum (EXCLUDE baths and showers)		

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2.	**BATHING**	How resident takes full-body bath/shower, sponge bath, and transfers in/out of tub/shower (EXCLUDE washing of back and hair.) ***Code for most dependent*** *in self-performance and support.* **(A)** BATHING SELF-PERFORMANCE codes appear below 0. Independent—No help provided 1. Supervision—Oversight help only 2. Physical help limited to transfer only 3. Physical help in part of bathing activity 4. Total dependence 8. Activity itself did not occur during entire 7 days *(Bathing support codes are as defined in* ***Item 1, code B above****)*	(A)	(B)
3.	**TEST FOR BALANCE** (see training manual)	*(Code for ability during test in the* ***last 7 days****)* 0. Maintained position as required in test 1. Unsteady, but able to rebalance self without physical support 2. Partial physical support during test; or stands (sits) but does not follow directions for test 3. Not able to attempt test without physical help a. Balance while standing b. Balance while sitting—position, trunk control		
4.	**FUNCTIONAL LIMITATION IN RANGE OF MOTION** (see training manual)	*(Code for limitations during* ***last 7 days*** *that interfered with daily functions or placed resident at risk of injury)* **(A)** *RANGE OF MOTION* 0. No limitation 1. Limitation on one side 2. Limitation on both sides **(B)** *VOLUNTARY MOVEMENT* 0. No loss 1. Partial loss 2. Full loss a. Neck b. Arm—Including shoulder or elbow c. Hand—Including wrist or fingers d. Leg—Including hip or knee e. Foot—Including ankle or toes f. Other limitation or loss	(A)	(B)

5.	**MODES OF LOCOMOTION**	*(**Check all that apply** during **last 7 days**)*				
		Cane/walker/crutch	a.	Wheelchair primary mode of locomotion	d.	
		Wheeled self	b.			
		Other person wheeled	c.	*NONE OF ABOVE*	e.	
6.	**MODES OF TRANSFER**	*(**Check all that apply** during **last 7 days**)*				
		Bedfast all or most of time	a.	Lifted mechanically	d.	
		Bed rails used for bed mobility or transfer	b.	Transfer aid (e.g., slide board, trapeze, cane, walker, brace)	e.	
		Lifted manually	c.	*NONE OF ABOVE*	f.	
7.	**TASK SEGMENTATION**	Some or all of ADL activities were broken into subtasks during **last 7 days** so that resident could perform them 0. No 1. Yes				
8.	**ADL FUNCTIONAL REHABILITATION POTENTIAL**	Resident believes he/she is capable of increased independence in at least some ADLs			a.	
		Direct care staff believe resident is capable of increased independence in at least some ADLs			b.	
		Resident able to perform tasks/activity but is very slow			c.	
		Difference in ADL Self-Performance or ADL Support, comparing mornings to evenings			d.	
		NONE OF ABOVE			e.	
9.	**CHANGE IN ADL FUNCTION**	Resident's ADL self-performance status has changed as compared to status of **90 days ago** (or since last assessment if less than 90 days) 0. No change 1. Improved 2. Deteriorated				

SECTION H. CONTINENCE IN LAST 14 DAYS

1.	CONTINENCE SELF-CONTROL CATEGORIES (***Code for resident's PERFORMANCE OVER ALL SHIFTS***) 0. *CONTINENT*—Complete control *[includes use of indwelling urinary catheter or ostomy device that does not leak urine or stool]* 1. *USUALLY CONTINENT*—BLADDER, incontinent episodes once a week or less; BOWEL, less than weekly 2. *OCCASIONALLY INCONTINENT*—BLADDER, 2 or more times a week but not daily; BOWEL, once a week 3. *FREQUENTLY INCONTINENT*—BLADDER, tended to be incontinent daily, but some control present (e.g., on day shift); BOWEL, 2-3 times a week 4. *INCONTINENT*—Had inadequate control BLADDER, multiple daily episodes; BOWEL, all (or almost all) of the time					
a.	**BOWEL CONTINENCE**	Control of bowel movement, with appliance or bowel continence programs, if employed				
b.	**BLADDER CONTINENCE**	Control of urinary bladder function (if dribbles, volume insufficient to soak through underpants), with appliances (e.g., foley) or continence programs, if employed				
2.	**BOWEL ELIMINATION PATTERN**	Bowel elimination pattern regular—at least one movement every three days	a.	Diarrhea	c.	
				Fecal impaction	d.	
		Constipation	b.	*NONE OF ABOVE*	e.	

3.	**APPLIANCES AND PROGRAMS**	Any scheduled toileting plan	a.	Did not use toilet room/ commode/urinal	f.
		Bladder retraining program	b.	Pads/briefs used	g.
		External (condom) catheter	c.	Enemas/irrigation	h.
		Indwelling catheter	d.	Ostomy present	i.
		Intermittent catheter	e.	*NONE OF ABOVE*	j.
4.	**CHANGE IN URINARY CONTINENCE**	Resident's urinary continence has changed as compared to status of **90 days ago** (or since last assessment if less than 90 days) 0. No change 1. Improved 2. Deteriorated			

SECTION I. DISEASE DIAGNOSES

Check only those diseases that have a relationship to current ADL status, cognitive status, mood and behavior status, medical treatments, nursing monitoring, or risk of death. (Do not list inactive diagnoses)

1.	**DISEASES**	*(**If none apply, CHECK the NONE OF ABOVE box**)*			
		ENDOCRINE/METABOLIC/ NUTRITIONAL		Hemiplegia/Hemiparesis	v.
		Diabetes mellitus	a.	Multiple sclerosis	w.
		Hyperthyroidism	b.	Paraplegia	x.
		Hypothyroidism	c.	Parkinson's disease	y.
		HEART/CIRCULATION		Quadriplegia	z.
		Arteriosclerotic heart disease (ASHD)	d.	Seizure disorder	aa.
		Cardiac dysrhythmias	e.	Transient ischemic attack (TIA)	bb.
		Congestive heart failure	f.	Traumatic brain injury	cc.
		Deep vein thrombosis	g.	**PSYCHIATRIC/MOOD**	
		Hypertension	h.	Anxiety disorder	dd.
		Hypotension	i.	Depression	ee.
		Peripheral vascular disease	j.	Manic depression (bipolar disease)	ff.
		Other cardiovascular disease	k.	Schizophrenia	gg.
		MUSCULOSKELETAL		**PULMONARY**	
		Arthritis	l.	Asthma	hh.
		Hip fracture	m.	Emphysema/COPD	ii.
		Missing limb (e.g., amputation)	n.	**SENSORY**	
		Osteoporosis	o.	Cataracts	jj.
		Pathological bone fracture	p.	Diabetic retinopathy	kk.
		NEUROLOGICAL		Glaucoma	ll.
		Alzheimer's disease	q.	Macular degeneration	mm.
		Aphasia	r.	**OTHER**	
		Cerebral palsy	s.	Allergies	nn.
		Cerebrovascular accident (stroke)	t.	Anemia	oo.
		Dementia other than Alzheimer's disease	u.	Cancer	pp.
				Renal failure	qq.
				NONE OF ABOVE	rr.
2.	**INFECTIONS**	*(**If none apply, CHECK the NONE OF ABOVE box**)*			
		Antibiotic resistant infection (e.g., Methicillin resistant staph)	a.	Septicemia	g.
		Clostridium difficile (c. diff.)	b.	Sexually transmitted diseases	h.
		Conjunctivitis	c.	Tuberculosis	i.
		HIV infection	d.	Urinary tract infection **in last 30 days**	j.
		Pneumonia	e.	Viral hepatitis	k.
		Respiratory infection	f.	Wound infection	l.
				NONE OF ABOVE	m.
3.	**OTHER CURRENT OR MORE DETAILED DIAGNOSES AND ICD-9 CODES**	a. _____			
		b. _____			
		c. _____			
		d. _____			
		e. _____			

SECTION J. HEALTH CONDITIONS

1.	**PROBLEM CONDITIONS**	*(**Check all problems present** in **last 7 days** unless other time frame is indicated)*			
		INDICATORS OF FLUID STATUS		Dizziness/Vertigo	f.
		Weight gain or loss of 3 or more pounds within a 7 day period	a.	Edema	g.
		Inability to lie flat due to shortness of breath	b.	Fever	h.
		Dehydrated; output exceeds input	c.	Hallucinations	i.
		Insufficient fluid; did **NOT** consume all/almost all liquids provided during **last 3 days**	d.	Internal bleeding	j.
		OTHER		Recurrent lung aspirations in **last 90 days**	k.
		Delusions	e.	Shortness of breath	l.
				Syncope (fainting)	m.
				Unsteady gait	n.
				Vomiting	o.
				NONE OF ABOVE	p.

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2.	PAIN SYMPTOMS	(*Code the **highest level of pain** present in the **last 7 days***)			
		a. FREQUENCY with which resident complains or shows evidence of pain 0. No pain (*skip to J4*) 1. Pain less than daily 2. Pain daily		**b. INTENSITY** of pain 1. Mild pain 2. Moderate pain 3. Times when pain is horrible or excruciating	
3.	PAIN SITE	(*If pain present, **check all sites** that apply in **last 7 days***)			
		Back pain	a.	Incisional pain	f.
		Bone pain	b.	Joint pain (other than hip)	g.
		Chest pain while doing usual activities	c.	Soft tissue pain (e.g., lesion, muscle)	h.
		Headache	d.	Stomach pain	i.
		Hip pain	e.	Other	j.
4.	ACCIDENTS	(*Check all that apply*)			
		Fell in **past 30 days**	a.	Hip fracture in **last 180 days**	c.
		Fell in **past 31-180 days**	b.	Other fracture in **last 180 days**	d.
				NONE OF ABOVE	e.
5.	STABILITY OF CONDITIONS	Conditions/diseases make resident's cognitive, ADL, mood or behavior patterns unstable—(fluctuating, precarious, or deteriorating)			a.
		Resident experiencing an acute episode or a flare-up of a recurrent or chronic problem			b.
		End-stage disease, 6 or fewer months to live			c.
		NONE OF ABOVE			d.

SECTION K. ORAL/NUTRITIONAL STATUS

1.	ORAL PROBLEMS	Chewing problem			a.
		Swallowing problem			b.
		Mouth pain			c.
		NONE OF ABOVE			d.
2.	HEIGHT AND WEIGHT	*Record (a.) **height in inches** and (b.) **weight in pounds**. Base weight on most recent measure in **last 30 days**; measure weight consistently in accord with standard facility practice—e.g., in a.m. after voiding, before meal, with shoes off, and in nightclothes* a. HT (in.) ___ ___ ___ b. WT (lb.) ___ ___ ___			
3.	WEIGHT CHANGE	**a. Weight loss**—5 % or more in **last 30 days**; or 10 % or more in **last 180 days** 0. No 1. Yes			
		b. Weight gain—5 % or more in **last 30 days**; or 10 % or more in **last 180 days** 0. No 1. Yes			
4.	NUTRITIONAL PROBLEMS	Complains about the taste of many foods	a.	Leaves 25% or more of food uneaten at most meals	c.
		Regular or repetitive complaints of hunger	b.	*NONE OF ABOVE*	d.
5.	NUTRITIONAL APPROACHES	(*Check **all that apply in last 7 days***)			
		Parenteral/IV	a.	Dietary supplement between meals	f.
		Feeding tube	b.	Plate guard, stabilized built-up utensil, etc.	g.
		Mechanically altered diet	c.	On a planned weight change program	h.
		Syringe (oral feeding)	d.	*NONE OF ABOVE*	i.
		Therapeutic diet	e.		
6.	PARENTERAL OR ENTERAL INTAKE	(*Skip to Section L **if neither 5a nor 5b is checked***) a. Code the proportion of **total calories** the resident received through parenteral or tube feedings in the **last 7 days** 0. None 3. 51% to 75% 1. 1% to 25% 4. 76% to 100% 2. 26% to 50% **b.** Code the average **fluid intake** per day by IV or tube in **last 7 days** 0. None 3. 1001 to 1500 cc/day 1. 1 to 500 cc/day 4. 1501 to 2000 cc/day 2. 501 to 1000 cc/day 5. 2001 or more cc/day			

SECTION L. ORAL/DENTAL STATUS

1.	ORAL STATUS AND DISEASE PREVENTION	Debris (soft, easily movable substances) present in mouth prior to going to bed at night	a.
		Has dentures or removable bridge	b.
		Some/all natural teeth lost—does not have or does not use dentures (or partial plates)	c.
		Broken, loose, or carious teeth	d.
		Inflamed gums (gingiva); swollen or bleeding gums; oral abcesses; ulcers or rashes	e.
		Daily cleaning of teeth/dentures or daily mouth care—by resident or staff	f.
		NONE OF ABOVE	g.

SECTION M. SKIN CONDITION

				Number at Stage
1.	ULCERS (Due to any cause)	(*Record the number of ulcers at each ulcer stage—regardless of cause. If none present at a stage, record "0" (zero). Code all that apply during **last 7 days**. Code 9 = 9 or more.) **[Requires full body exam.]***		
		a. Stage 1. A persistent area of skin redness (without a break in the skin) that does not disappear when pressure is relieved.		
		b. Stage 2. A partial thickness loss of skin layers that presents clinically as an abrasion, blister, or shallow crater.		
		c. Stage 3. A full thickness of skin is lost, exposing the subcutaneous tissues - presents as a deep crater with or without undermining adjacent tissue.		
		d. Stage 4. A full thickness of skin and subcutaneous tissue is lost, exposing muscle or bone.		
2.	TYPE OF ULCER	(*For each type of ulcer, **code for the highest stage in the last 7 days** using scale in item M1—i.e., 0=none; stages 1, 2, 3, 4*)		
		a. Pressure ulcer—any lesion caused by pressure resulting in damage of underlying tissue		
		b. Stasis ulcer—open lesion caused by poor circulation in the lower extremities		
3.	HISTORY OF RESOLVED ULCERS	Resident had an ulcer that was resolved or cured **in LAST 90 DAYS** 0. No 1. Yes		
4.	OTHER SKIN PROBLEMS OR LESIONS PRESENT	(*Check **all that apply** during **last 7 days***)		
		Abrasions, bruises		a.
		Burns (second or third degree)		b.
		Open lesions other than ulcers, rashes, cuts (e.g., cancer lesions)		c.
		Rashes—e.g., intertrigo, eczema, drug rash, heat rash, herpes zoster		d.
		Skin desensitized to pain or pressure		e.
		Skin tears or cuts (other than surgery)		f.
		Surgical wounds		g.
		NONE OF ABOVE		h.
5.	SKIN TREATMENTS	(*Check **all that apply** during **last 7 days***)		
		Pressure relieving device(s) for chair		a.
		Pressure relieving device(s) for bed		b.
		Turning/repositioning program		c.
		Nutrition or hydration intervention to manage skin problems		d.
		Ulcer care		e.
		Surgical wound care		f.
		Application of dressings (with or without topical medications) other than to feet		g.
		Application of ointments/medications (other than to feet)		h.
		Other preventative or protective skin care (other than to feet)		i.
		NONE OF ABOVE		j.
6.	FOOT PROBLEMS AND CARE	(*Check **all that apply** during **last 7 days***)		
		Resident has one or more foot problems—e.g., corns, callouses, bunions, hammer toes, overlapping toes, pain, structural problems		a.
		Infection of the foot—e.g., cellulitis, purulent drainage		b.
		Open lesions on the foot		c.
		Nails/calluses trimmed during **last 90 days**		d.
		Received preventative or protective foot care (e.g., used special shoes, inserts, pads, toe separators)		e.
		Application of dressings (with or without topical medications)		f.
		NONE OF ABOVE		g.

SECTION N. ACTIVITY PURSUIT PATTERNS

1.	TIME AWAKE	(*Check appropriate time periods over last 7 days*) Resident awake all or most of time (i.e., naps no more than one hour per time period) in the:			
		Morning	a.	Evening	c.
		Afternoon	b.	*NONE OF ABOVE*	d.
(If resident is comatose, skip to Section O)					
2.	AVERAGE TIME INVOLVED IN ACTIVITIES	(**When awake and not receiving treatments or ADL care**) 0. Most—more than 2/3 of time 2. Little—less than 1/3 of time 1. Some—from 1/3 to 2/3 of time 3. None			
3.	PREFERRED ACTIVITY SETTINGS	(*Check **all settings** in which activities are **preferred***)			
		Own room	a.	Outside facility	d.
		Day/activity room	b.	*NONE OF ABOVE*	e.
		Inside NH/off unit	c.		
4.	GENERAL ACTIVITY PREFERENCES (adapted to resident's current abilities)	(*Check **all PREFERENCES** whether or not activity is currently available to resident*)			
		Cards/other games	a.	Trips/shopping	g.
		Crafts/arts	b.	Walking/wheeling outdoors	h.
		Exercise/sports	c.	Watching TV	i.
		Music	d.	Gardening or plants	j.
		Reading/writing	e.	Talking or conversing	k.
		Spiritual/religious activities	f.	Helping others	l.
				NONE OF ABOVE	m.

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5.	PREFERS CHANGE IN DAILY ROUTINE	*Code for resident preferences in daily routines* 0. No change 1. Slight change 2. Major change	
		a. Type of activities in which resident is currently involved	
		b. Extent of resident involvement in activities	

SECTION O. MEDICATIONS

1.	NUMBER OF MEDICATIONS	(*Record the number of different medications used in the last 7 days; enter "0" if none used*)	
2.	NEW MEDICATIONS	(*Resident currently receiving medications that were initiated during the last 90 days*) 0. No 1. Yes	
3.	INJECTIONS	(*Record the number of DAYS injections of any type received during the last 7 days; enter "0" if none used*)	
4.	DAYS RECEIVED THE FOLLOWING MEDICATION	(*Record the number of DAYS during last 7 days; enter "0" if not used. Note—enter "1" for long-acting meds used less than weekly*)	
		a. Antipsychotic	
		b. Antianxiety	
		c. Antidepressant	
		d. Hypnotic	
		e. Diuretic	

SECTION P. SPECIAL TREATMENTS AND PROCEDURES

1.	SPECIAL TREATMENTS, PROCEDURES, AND PROGRAMS	a. **SPECIAL CARE—*Check*** *treatments or programs received during the last 14 days*	
		TREATMENTS	
		Chemotherapy	a.
		Dialysis	b.
		IV medication	c.
		Intake/output	d.
		Monitoring acute medical condition	e.
		Ostomy care	f.
		Oxygen therapy	g.
		Radiation	h.
		Suctioning	i.
		Tracheostomy care	j.
		Transfusions	k.
		Ventilator or respirator	l.
		PROGRAMS	
		Alcohol/drug treatment program	m.
		Alzheimer's/dementia special care unit	n.
		Hospice care	o.
		Pediatric unit	p.
		Respite care	q.
		Training in skills required to return to the community (e.g., taking medications, house work, shopping, transportation, ADLs)	r.
		NONE OF ABOVE	s.

b. THERAPIES - *Record the number of days and total minutes each of the following therapies was administered (for at least 15 minutes a day) in the last 7 calendar days (Enter 0 if none or less than 15 min. daily)*
[Note—count only post admission therapies]

	DAYS (A)	MIN (B)
(A) = # of days administered for **15 minutes or more**		
(B) = total # of minutes provided in **last 7 days**		
a. Speech - language pathology and audiology services		
b. Occupational therapy		
c. Physical therapy		
d. Respiratory therapy		
e. Psychological therapy (by any licensed mental health professional)		

2.	INTERVENTION PROGRAMS FOR MOOD, BEHAVIOR, COGNITIVE LOSS	(**Check all interventions or strategies used in last 7 days**—no matter where received)	
		Special behavior symptom evaluation program	a.
		Evaluation by a licensed mental health specialist in **last 90 days**	b.
		Group therapy	c.
		Resident-specific deliberate changes in the environment to address mood/behavior patterns—e.g., providing bureau in which to rummage	d.
		Reorientation—e.g., cueing	e.
		NONE OF ABOVE	f.
3.	NURSING REHABILITATION/ RESTORATIVE CARE	*Record the NUMBER OF DAYS each of the following rehabilitation or restorative techniques or practices was **provided to the resident for more than or equal to 15 minutes per day in the last 7 days** (Enter 0 if none or less than 15 min. daily.)*	
		a. Range of motion (passive)	
		b. Range of motion (active)	
		c. Splint or brace assistance	
		TRAINING AND SKILL PRACTICE IN:	
		d. Bed mobility	
		e. Transfer	
		f. Walking	
		g. Dressing or grooming	
		h. Eating or swallowing	
		i. Amputation/prosthesis care	
		j. Communication	
		k. Other	

4.	DEVICES AND RESTRAINTS	(*Use the following codes for **last 7 days**:*) 0. Not used 1. Used less than daily 2. Used daily	
		Bed rails	
		a. — Full bed rails on all open sides of bed	
		b. — Other types of side rails used (e.g., half rail, one side)	
		c. Trunk restraint	
		d. Limb restraint	
		e. Chair prevents rising	
5.	HOSPITAL STAY(S)	Record number of times resident was admitted to hospital with an overnight stay **in last 90 days** (or since last assessment if less than 90 days). (*Enter 0 if no hospital admissions*)	
6.	EMERGENCY ROOM (ER) VISIT(S)	Record number of times resident visited ER without an overnight stay **in last 90 days** (or since last assessment if less than 90 days). (*Enter 0 if no ER visits*)	
7.	PHYSICIAN VISITS	In the **LAST 14 DAYS** (or since admission if less than 14 days in facility) how many days has the physician (or authorized assistant or practitioner) examined the resident? (*Enter 0 if none*)	
8.	PHYSICIAN ORDERS	In the **LAST 14 DAYS** (or since admission if less than 14 days in facility) how many days has the physician (or authorized assistant or practitioner) changed the resident's orders? *Do not include order renewals without change.* (*Enter 0 if none*)	
9.	ABNORMAL LAB VALUES	Has the resident had any abnormal lab values during the **last 90 days** (or since admission)? 0. No 1. Yes	

SECTION Q. DISCHARGE POTENTIAL AND OVERALL STATUS

1.	DISCHARGE POTENTIAL	a. Resident expresses/indicates preference to return to the community 0. No 1. Yes	
		b. Resident has a support person who is positive towards discharge 0. No 1. Yes	
		c. Stay projected to be of a short duration— discharge projected **within 90 days** (do not include expected discharge due to death) 0. No 2. Within 31-90 days 1. Within 30 days 3. Discharge status uncertain	
2.	OVERALL CHANGE IN CARE NEEDS	Resident's overall self sufficiency has changed significantly as compared to status of **90 days ago** (or since last assessment if less than 90 days) 0. No change 1. Improved—receives fewer supports, needs less restrictive level of care 2. Deteriorated—receives more support	

SECTION R. ASSESSMENT INFORMATION

1.	PARTICIPATION IN ASSESSMENT	a. Resident: 0. No 1. Yes	
		b. Family: 0. No 1. Yes 2. No family	
		c. Significant other: 0. No 1. Yes 2. None	
2.	**SIGNATURE OF PERSON COORDINATING THE ASSESSMENT:**		
		a. Signature of RN Assessment Coordinator (sign on above line)	
		b. Date RN Assessment Coordinator signed as complete Month Day Year	

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SECTION T. THERAPY SUPPLEMENT FOR MEDICARE PPS

1. SPECIAL TREATMENTS AND PROCEDURES

a. RECREATION THERAPY—*Enter number of days and total minutes of recreation therapy administered (**for at least 15 minutes a day**) in the **last 7 days** (Enter 0 if none)*

	DAYS (A)	MIN (B)
(A) = # of days administered for 15 minutes or more **(B) = total # of minutes** provided in last 7 days		

Skip unless this is a Medicare 5 day or Medicare readmission/return assessment.

b. ORDERED THERAPIES—*Has physician ordered any of following therapies to begin in FIRST 14 days of stay—physical therapy, occupational therapy, or speech pathology service?*
0. No 1. Yes

If not ordered, skip to item 2

c. Through day 15, provide an estimate of the number of days when at least 1 therapy service can be expected to have been delivered.

d. Through day 15, provide an estimate of the number of therapy minutes (across the therapies) that can be expected to be delivered?

2. WALKING WHEN MOST SELF SUFFICIENT

Complete item 2 if ADL self-performance score for TRANSFER (G.1.b.A) is 0,1,2, or 3 AND at least one of the following are present:
- Resident received physical therapy involving gait training (P.1.b.c)
- Physical therapy was ordered for the resident involving gait training (T.1.b)
- Resident received nursing rehabilitation for walking (P.3.f)
- Physical therapy involving walking has been discontinued within the past 180 days

Skip to item 3 if resident did not walk in last 7 days

(FOR FOLLOWING FIVE ITEMS, BASE CODING ON THE EPISODE WHEN THE RESIDENT WALKED THE FARTHEST WITHOUT SITTING DOWN. INCLUDE WALKING DURING REHABILITATION SESSIONS.)

a. Furthest distance walked without sitting down during this episode.

0. 150+ feet
1. 51-149 feet
2. 26-50 feet
3. 10-25 feet
4. Less than 10 feet

b. Time walked without sitting down during this episode.

0. 1-2 minutes
1. 3-4 minutes
2. 5-10 minutes
3. 11-15 minutes
4. 16-30 minutes
5. 31+ minutes

c. Self-Performance in walking during this episode.

0. *INDEPENDENT*—No help or oversight
1. *SUPERVISION*—Oversight, encouragement or cueing provided
2. *LIMITED ASSISTANCE*—Resident highly involved in walking; received physical help in guided maneuvering of limbs or other nonweight bearing assistance
3. *EXTENSIVE ASSISTANCE*—Resident received weight bearing assistance while walking

d. Walking support provided associated with this episode (code regardless of resident's self-performance classification).

0. No setup or physical help from staff
1. Setup help only
2. One person physical assist
3. Two+ persons physical assist

e. Parallel bars used by resident in association with this episode.

0. No 1. Yes

3. CASE MIX GROUP

Medicare _____ **State** _____

MDS 2.0 September, 2000

SECTION V. RESIDENT ASSESSMENT PROTOCOL SUMMARY Numeric Identifier _____

Resident's Name:	Medical Record No.:

1. Check if RAP is triggered.
2. For each triggered RAP, use the RAP guidelines to identify areas needing further assessment. Document relevant assessment information regarding the resident's status.
   - Describe:
     — Nature of the condition (may include presence or lack of objective data and subjective complaints).
     — Complications and risk factors that affect your decision to proceed to care planning.
     — Factors that must be considered in developing individualized care plan interventions.
     — Need for referrals/further evaluation by appropriate health professionals.
   - Documentation should support your decision-making regarding whether to proceed with a care plan for a triggered RAP and the type(s) of care plan interventions that are appropriate for a particular resident.
   - Documentation may appear anywhere in the clinical record (e.g., progress notes, consults, flowsheets, etc.).
3. Indicate under the Location of RAP Assessment Documentation column where information related to the RAP assessment can be found.
4. For each triggered RAP, indicate whether a new care plan, care plan revision, or continuation of current care plan is necessary to address the problem(s) identified in your assessment. The Care Planning Decision column must be completed within 7 days of completing the RAI (MDS and RAPs).

A. RAP PROBLEM AREA	(a) Check if triggered	Location and Date of RAP Assessment Documentation	(b) Care Planning Decision—check if addressed in care plan
1. DELIRIUM	☐		☐
2. COGNITIVE LOSS	☐		☐
3. VISUAL FUNCTION	☐		☐
4. COMMUNICATION	☐		☐
5. ADL FUNCTIONAL/ REHABILITATION POTENTIAL	☐		☐
6. URINARY INCONTINENCE AND INDWELLING CATHETER	☐		☐
7. PSYCHOSOCIAL WELL-BEING	☐		☐
8. MOOD STATE	☐		☐
9. BEHAVIORAL SYMPTOMS	☐		☐
10. ACTIVITIES	☐		☐
11. FALLS	☐		☐
12. NUTRITIONAL STATUS	☐		☐
13. FEEDING TUBES	☐		☐
14. DEHYDRATION/FLUID MAINTENANCE	☐		☐
15. DENTAL CARE	☐		☐
16. PRESSURE ULCERS	☐		☐
17. PSYCHOTROPIC DRUG USE	☐		☐
18. PHYSICAL RESTRAINTS	☐		☐

B.

1. Signature of RN Coordinator for RAP Assessment Process

2. ☐☐ – ☐☐ – ☐☐☐☐ (Month – Day – Year)

3. Signature of Person Completing Care Planning Decision

4. ☐☐ – ☐☐ – ☐☐☐☐ (Month – Day – Year)

MDS 2.0 September, 2000

APPENDIX 2: REQUEST LETTER

School of Nursing
The University of Texas at Austin

1700 Red River • Austin, TX 78701-1499
(512) 471-7311 • FAX (512) 471-4910

June 3, 2009

Maribel Franey, Division Director
Division of Privacy Compliance Data Development (DPC)
Centers for Medicare & Medicaid Services (CMS)
OIS/EASG/DPC N2-04-27
7500 Security Blvd.
Baltimore, Maryland 21244-1850

Dear Division Director:

I am requesting CMS data to complete research funded by Vickie Ragsdale, PhD candidate for her dissertation. The principal investigator of record for this research is Graham McDougall, PhD, in keeping with the University's policy for "exempt" research of only faculty and selected staff serving as the principal investigator. (Exempt status can be reviewed in the document: IRB Approval-IRB Protocol 2009-03-0066).

These data will be used for a study entitled Influence of Licensed Staffing Hours, Contract Nursing, and Turnover on MDS-Based Quality Measures in Texas Nursing Homes. This study intends to determine the relationship between staffing levels: hours per resident day (hprd), staff turnover rate, and five quality measures, specifically (1) ADL decline, (2) physical restraint use (3) high risk pressure ulcers, stage 1-4, (4) low risk pressure ulcers, stage 1-4, & (5) weight loss while controlling for facility and resident characteristics. The study objective is to compare the association between registered nurse (RN) hours per resident day, RN turnover rate, percentage of RN time that is contract, licensed vocational nurse (LVN) hours per resident day, LVN turnover rate, and percentage of LVN time that is contract to resident outcomes through multiple linear regression techniques.

Specifically, I am requesting the following CMS data:

- 1 year of Texas MDS data for CMI (RUG) calculation (target date of 2007)
- 1 year of Texas facility-level QI/QM data for nursing homes

Because it is not my intention to link these data with data received by CMS in the past, we do not require a Conversion/Crosswalk File for linking to other data containing SSNs, HICs, or Res_ID.

It's believed that the extract methodology results in the minimum data necessary to conduct the proposed analysis.

I am requesting these data on
CD

APPENDIX 3: CENTERS FOR MEDICARE & MEDICAID SERVICES APPROVAL

Wednesday, July 15, 2009

EDG#9804/DUA 19815
Graham McDougall, University of Texas at Austin, School of Nursing
This is in response to your request seeking approval to use CMS data for the project titled, "Influence of Licensed Staffing Hours, Contract Nursing and Turnover Rate on MDS-Based Quality Measures in Texas Nursing Homes." CMS have reviewed and approved your request. Please refer to DUA number 19815 when addressing inquiries of any nature concerning this agreement. To avoid delay and ensure that your payment is received and processed properly, please follow the instructions below:

(1) Include the Cost Estimate with the Check
(2) Make the payment to the CMS account that is appropriate for your request, for example, CMS-PACT Account; Attention Karen Edrington.
(3) Include the DUA Number and the EDG Number in the check memo field.
(4) Ensure that the check is sent to CMS using the correct USPS or FedEx/Overnight Address;
(5) E-mail the check details to me once your accounting department has issued the check (check number, date, amount, and issuing institution).

FedEx/Overnight Delivery Services; Centers for Medicare and Medicaid Services; Attn: Division of Accounting Operations; Mailstop C3-11-03; 7500 Security Blvd; Baltimore, Maryland 21244

By Mail; Centers for Medicare and Medicaid Services; Attn: Division of Accounting Operations; P. O. Box 7520; Baltimore, Maryland, 21207-0520
If you have any questions about this DUA or the use of the CMS data, please contact me on (410) 786-5998.

Thank you,

Carleen Basso, Health Insurance Specialist
Office of Information Services
Enterprise Architecture & Strategy Group
Division of Privacy Compliance
7500 Security Boulevard, N2-04-27
Baltimore, Maryland 1244 Phone
410-786-5998 FAX 410-786-5636

APPENDIX 4: CENTERS FOR MEDICARE AND MEDICAID SERVICES GUIDELINES

Centers for Medicare & Medicaid Services (CMS)
Data Use Agreement (DUA) Guidelines

1. Requestor agrees to notify CMS if their project is completed sooner than the expiration date specified in the DUA.

2. Requestor agrees that any data provided by CMS will not be physically moved or electronically transmitted in any way from the site indicated in the DUA without expressed written authorization from CMS. If location needs to be modified, the DUA should be updated to include the new location.

3. Upon completion of the project and/or expiration of the DUA, the data must be returned to CMS at the requestor's expense or destroyed and a statement certifying this action sent to CMS. The Requestor agrees that no data, copies, or parts thereof, shall be retained when the file(s) are returned or destroyed, unless CMS has authorized in writing such retention of said file(s). These options are explained below:

   a. Return data (and any derivative files) to CMS along with a letter delineating the data set names and volume/serial numbers of the files being returned. The letter should reference the DUA number and study name. This letter and the data should be sent to the following address:

      Centers for Medicare & Medicaid Services
      CMS Data Center
      North Building
      Attention: Data Release Area
      7500 Security Boulevard
      Baltimore, Maryland 21244-1850; or

   b. Destroy data and provide a letter to CMS on your organization's letterhead certifying that this action has taken place. This letter must reference the DUA number, study name, the data set names, and volume/serial numbers of the files being destroyed. The Requestor should forward this information to:

      Director DPCDD
      Centers for Medicare & Medicaid Services
      Division of Privacy Compliance
      Data Development (DPCDD)
      Enterprise Databases Group
      7500 Security Boulevard
      Mailstop: N2-04-27
      Baltimore, Maryland 21244-1850

4. If the project is still active and the DUA has expired, a one (1) year extension may be granted. The extension will only be approved if the data will continue to be used for the original project purpose and the expiration date has occurred within the past year; otherwise, a new DUA must be negotiated. The letter requesting an extension should be directed to the name and address in item 3b above.

5. **Please visit our new website, Privacy Protected Data Request: Policies and Procedures at: http://www.cms.hhs.gov/PrivProtectedData/.**

APPENDIX 5: UNIVERSITY OF TEXAS INSTITUTIONAL REVIEW BOARD APPROVAL

OFFICE OF RESEARCH SUPPORT
THE UNIVERSITY OF TEXAS AT AUSTIN
P.O. Box 7426, Austin, Texas 78713 (512) 471-8871 -FAX (512 471-8873) North Office Building A, Suite 5.200 (Mail code A3200)

FWA: 2030
Date: 04/20/09

PI(s): Graham J McDougall Jr **Department & Mail Code: NURSING SCHOOL** **D0100**
Vickie L Ragsdale

IRB Approval-IRB Protocol #: 2009-03-0066

EXEMPT DETERMINATION OF RESEARCH PROPOSAL

Title: Influence of Licensed Staffing Hours, Contract Nursing, and Turnover on MDS-Based Quality Measures in Texas Nursing Homes

Approval Period: 04/20/2009 **04/19/2012** *(expires 12am [midnight] of this date.)*
This research project has been approved for a period of three years.
Approval determination was based on the following Code of Federal Regulations:
45 CFR 46.101(b):

(4) Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.

Responsibilities of the Principal Investigator(s):
Research that is determined to be Exempt from IRB review is not Exempt from protection of the human subjects. The following criteria to protect human subjects must be met:

1. The investigator assures that **all investigators and co-investigators** are **trained** in the **ethical principles**, relevant Federal Regulations and institutional policies governing human **subject research;**
2. The investigator assures **that human subjects will voluntarily consent to participate** in the research when appropriate (e.g. surveys, interviews) and will **provide subjects with pertinent information**, e.g. risks and benefits, contact information for investigators and IRB chair, etc.;
3. The investigator assures that **human subjects will be selected equitably**, so that the risks and benefits of the research are justly distributed.
4. The investigator assures that the **IRB will be immediately informed of any information, unanticipated problems** that would increase the risk to the human subjects and cause the category of review to be upgraded to Expedited or Full Review;
5. The investigator assures that the **IRB will be immediately informed of any complaints** from participants regarding their risks and benefits; and
6. The investigator assures that **confidentiality and privacy of the subjects** and the research data will be maintained appropriately to ensure minimal risk to subjects.

The above criteria are specified in the PI Assurance Statement and as the Responsible Investigator, you acknowledged you understood and accepted these conditions with the submission of your protocol. Investigators can refer to the University website www.utexas.edu/irb for specific information on training, voluntary informed consent, privacy, and how to notify the IRB of unanticipated problems.

1. **Closure:** Upon completion of the research project, a closure request must be submitted to the Office of Research Support (ORS).
2. **Unanticipated Problems:** Any unanticipated problems or complaints must be reported to the IRB/ORS immediately. For a description of unanticipated problems, please refer to the ORS webpage: http://www.utexas.edu/research/rsc/humansubjects/policies/section7.html#7.3
3. **Informed Consent:** The informed consent procedures laid out within your research proposal must be followed.
4. **Continuing Review:** If the study will continue beyond the three year approval period, a continuing review application must be filed.
5. **Amendments:** Amendments do not need to be filed with the ORS if the amendments do not change the risk level of the study (for example: increasing sample size, adding or removing co-PIs, adding or removing research sites, or minor modifications to the research protocol that do not affect the risk level). Changes that alter the level of risk to participants must be requested by submitting an amendment application and revised proposal to the ORS prior to those changes being implemented. For a description of the types of modifications that require an amendment application, please refer to the ORS webpage: http://www.utexas.edu/research/rsc/humansubjects/policies/section6.html#635b , or call 471-8871.

If you have questions, please call your IRB Program Coordinator for consultation.

Thank you for your help in this matter.

Sincerely,

Jody Jensen, Ph.D., IRB Chair

APPENDIX 6: HEALTH AND HUMAN SERVICES COMMISSION COST REPORT

Form 8.0B1 - Rate Analysis Department HHSC - September 20, 2005

TEXAS HEALTH and HUMAN SERVICES COMMISSION
OPEN RECORDS BILLING FORM

Requesting Party:	Telephone Number:
Name: Vickie Ragsdale UT Austin - School of Nursing	(210) 380-5807
Address:	Fax Number:
	E-Mail: vragsdale@buckner.org

Description of Requested Information HHSC #: OR-20090708-4484

Database (Excel format) - Texas NF Cost Reports for 2007. (including cost report form, instructions, and provider list.)

CHARGES (see payment information at bottom of page)

Service Rendered	Cost / Per unit	Quantity	Item Total
Standard-Size Paper Copies	$ 0.10 / page	X	= $
Oversize Paper Copy	$ 0.50 / each	X	= $
Disks (CD or Floppy)	$ 1.00 / each	X	= $
Magnetic Tape	$ 10.00 / each	X	= $
VHS Video Cassette	$ 2.50 / each	X	= $
Audio Cassette	$ 1.00 / each	X	= $
Personnel Charge	$ 0.25 / minute	X	= $ 0.00
Overhead Charge (20% of Total Amount of Personnel Charge)	$ 20% of Personnel Charge Amount		= $ 0.00
Computer Resource Charge			
Mainframe	$ 17.50 / minute	X	= $
Midrange	$ 3.00 / minute	X	= $
Client/Server	$ 1.00 / minute	X	= $
PC or LAN	$ 0.50 / minute	X	= $
Programming Time	$ 0.50 / minute	X	= $
Postage and Shipping Charges	$ (actual cost)		= $
Fax Charges (per page)			
Local $0.10, Long Distance $0.50 or $1.00 (other area code)	$ / page	X	= $
Other Cost	$ (actual cost)		= $
description:			

TOTAL Charges	$ No Charge
Less Advance Deposit	$
BALANCE DUE	$ **No Charge**

Custodian of Record	Department	Telephone Number	Mail Code
Ray Wilson	Rate Analysis	(512) 491-1360	H-400

Signature - Employee Preparing Request Date

Ray Wilson 7/8/09

Signature - Manager Authorizing or Denying Request Date

Payment Information: *(Return a copy of this form with your payment)*

Review the description of requested information contained at the top of this page and/or page 2. Contact Rate Analysis at (512) 491-1358 should you have any questions. Remit payment for the total charge shown above along with a copy of this form. We will mail you the requested documents once your payment has been received.

Make payable to: Health and Human Services Commission

Regular Mail: Rate Analysis, Mail Code H-400
P.O. Box 85200
Austin, Texas 78708-5200
Important: Do no use window envelope

Overnight Courier: Rate Analysis, Mail Code H-400
(Physical Address) Braker Center, Bldg. H
11209 Metric Blvd.
Austin, Texas 78758

Method of Payment: ☐ Check # _____
(Cash NOT Accepted) ☐ Money Order # _____

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Vita

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